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Relationship between Social Determinants of Health and Control Status among Type 2 Diabetic Patients at UNRWA Health Centers in Gaza Governorates

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Dedication

To the soul of my father

Who taught me to persevere and prepared me to face the challenges with faith and humility. He is a constant source of inspiration in my life.

To My mother

The strong and the gentle soul, who always had confidence in me and offered me encouragement and support in all my endeavors

To my wonderful husband

Who provided me unflagging patience and support, and made it all possible

And

To my lovely kids and family

Declaration

I certify that this thesis submitted for the degree of master is the result of my own research, except where otherwise acknowledged, and that this thesis or any of its parts has not been submitted for higher degree to any other university or institution.

Signed:

Nesreen Zeyad El Halaby

Date:30/5/2018

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Abstract

Non-Communicable Diseases (NCD) is the main cause of mortality and morbidity in the last century because of the sedentary life style and urbanization. One of the major non-communicable disease is type 2 diabetes mellitus. The prevalence of diabetes mellitus in the Gaza Strip is 12.9% of population more than 40 years of age, and it's increasing dramatically.

Social determinants of health are the factors in which we live, grow, work and die. The aim of this study is to assess the relationship between the social determinants and control status among type2 diabetic patients at UNRWA Health Centers in Gaza Strip.

This study is cross sectional using interviewed Questionnaire. The study was applied at UNRWA health centers from May 2017 to February 2018.Proportional Stratified Random Sampling of the centers was used including the five governorates. The participants were patients who have type 2 diabetes file at UNRWA health centers, and they were selected from the centers. The number of the participants were 400 patients, 200 had controlled blood sugar (HBA1c 7 or less) and 200 had uncontrolled blood sugar (HBA1c more than 7) to allow comparison of social determinants of health among controlled and uncontrolled patients.
The sample was calculated according to the number of patients who have type 2 diabetes at UNRWA clinics to be representative sample, and ethical approval and verbal consent were obtained from the participants. For the analysis of data, SPSS software was used.

The researcher divided the social determinants into four domains the first one was socio-demographic variables, the second was health behavior, the third was health care provider approach and the fourth was social support. The dependent variable of the study was HBA1c.

The findings of the study showed that the age of patient has significant on the control of blood sugar with (r -0.196, p value 0.001), meaning that with increasing age the level of HBA1c will decrease. Being working or not have no significant effect on the control of blood sugar but the age of leaving work has a significant effect with (r -0.346, p value 0.003). The source of income has a significant effect on the control of blood sugar with (F 2.273, p value 0.020). Income also affect the control status meaning that getting sufficient income has better control than who has not sufficient income with (t -1.999 p value 0.047). Crowding index and living conditions have an effect on the control status with (r 0.124, p value 0.011) for crowding index and (F 4.522, p value 0.011) for living conditions.
Having comorbid condition such as hypertensionor cardiac disease affect the control status with (X^2 2.744.2.395 and p value 0.049, 0.042) respectively. Number of years of having diabetes is a factor that affects the control of diabetes with (r 0.174, p value 0.001). In addition, increasing the level of psychological distress significantly increases the level of HBA1c with (r 0.101, p value 0.044).On the other side, self-monitoring of blood sugar, and sleeping hours have no effect on the control of diabetes.
Regarding social support and health care provider approach, the researcher found no significant relationship with the control status of diabetes.
The study concluded thatsocial determinants of health have an effect on the control status of type 2 diabetes and controlling these determinants will improve the control of diabetes.

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List of Abbreviations

ANOVA	Analysis of Variance
BMI	Body Mass Index
CDC	Center for Disease Control and Prevention
CHD	Coronary Heart Disease
COPD	Chronic Obstructive Pulmonary Disease
CVD	Cardiovascular Disease
DM	Diabetes Mellitus
ESRD	End Stage Renal Disease
FPG	Fasting Plasma Glucose
GHQ	General Health Questionnaire
HBA1c	Glycosylated Hemoglobin
HDL	High Density Lipoprotein
HTN	Hypertension
LDL	Low Density Lipoprotein
MOH	Ministry of Health
MICS	Multiple Indicator Cluster Survey
NGOs	Non-Governmental Organization
OGTT	Oral Glucose Tolerance Test
PCBS	Palestinian Central Bureau of Statistics
PPG	Post Prandial Glucose
R	Correlation coefficient
SDH	Social Determinants of Health
SPSS	Statistical Package for the Social Sciences
SMBG	Self-Monitoring of Blood Glucose
UNRWA	United Nations Relief & Works Agency for Palestine Refugees in the Near East
WHO	World Health Organization

Chapter 1

Introduction

1.1 Background

Non-Communicable Diseases (NCD) is the main cause of mortality and morbidity in the last century because of the sedentary life style and urbanization. One of the major non-communicable disease is type 2 diabetes mellitus.

Globally, an estimated 422 million adults were living with diabetes in 2014, compared to 108 million in 1980. The global prevalence (age-standardized) of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population. This reflects an increase in associated risk factors such as being overweight or obese. Over the past decade, diabetes prevalence has risen faster in low- and middle-income countries than in high-income countries. Diabetes caused 1.5 million deaths in 2012. Higher-than-optimal blood glucose caused an additional 2.2 million deaths, by increasing the risks of cardiovascular and other diseases. Forty-three percent of these 3.7 million deaths occur before the age of 70 years. The percentage of deaths attributable to high blood glucose or diabetes that occurs prior to age 70 is higher in low- and middle-income countries than in high-income countries (World Health Organization, 2016).

Type 2 diabetes mellitus has many risk factors that lead to its incidence at earlier age and the early development of its complications (American Diabetes Association, 2016). Most interventions focus on life style modifications and the proper use of medication, but the control of blood sugar remain a challenging issue among diabetic patients(Current, 2012). Control of blood sugar among diabetic patients could be assessed by multiple tests, such as fasting plasma Glucose (FPG), post prandial glucose (PPG) or the most accurate test hemoglobin A1C (HBA1c), which could assess diabetes control status in the last 3months (Kasper et al.2015). Tight control of blood glucose is the best way to prevent the development of complications (American Daibetes Association, 2015).

Historically, research studies focusing on the proper management of disease by self-control of diabetes by diet and medication, which are the mainline for controlling blood sugar, and preventing its complications.However, they produce short-term outcomes and can'tbe maintained over time. Research more recently recognized other factors external to

individuals, namely the social determinants of health in order to achieve the goal of sustainable health outcomes among diabetic patients (Utz., 2014).

Despite differences in understanding what social determinants includes, there is consensus that social determinants of health are the conditions in which individuals are born, grow, live, work, and age and the system in place that manage them (Hill, 2013).The social determinants of health includeseducation, employment, income, smoking, self-efficacy, depression, stress, social support and occupation, these determinants has an effect on the control of blood sugar, the development of complicationsand also the burden of the disease(Center for Disease Control, 2016).

1.2Problem statements

Type 2 diabetes mellitus is a serious illness that occurs when the body is no longer able to produce enough insulin or when it is unable to use insulin properly (Center of Disease Control, 2016). The number of people with diabetes is rising all over the world, the global prevalence of diabetes in adults has risen from 4.7% in 1980 to 8.5% in 2014. The prevalence has been rising more rapidly in middle and low-income countries(WHO, 2016).

According to United Nations Relief & Works Agency for Palestine Refugees in the Near East(UNRWA) Annual Report 2016 in Gaza Strip, 12.9 % of poulation older than 40 years have diabetes and the percentage is increasing every year. Only 28% of them have controlled blood sugar.In addition,869 deaths were recorded in 2015 in Palestine due to complications of diabetes, at a mortality rate of 19.7 per 100,000 populations, with a mortality rate of 17.3 deaths per 100,000 males. The female rate was 19.9 deaths per 100,000 females in Palestine (Palestinian Central Bureau of Statistics, 2016).

Diabetes is a major cause of blindness, renal failure, heart attacks, stroke and lower limb amputation. Almost half of all deaths attributable to high blood glucose occur before the age of 70 years. One of WHO projects showed that diabetes would be the seventh leading cause of death in 2030 (WHO, 2016). Type 2 diabetes is caused and aggravated by a combination of environmental and genetic factors, but its consequences could be avoided or delayed with diet, physical activity, medication and regular screening and treatment of complications(Joslin Diabetes Center, 2018).

Complex factors in the physical and the social environments affects the health of diabetic patients, these factors are known as the social determinants of health. The social determinants could be the primary predictor and the best influencers of health

outcomes among diabetic patients (Hill, 2013). Poverty and unemployment for example may push individuals to chronic stress, can lead to increase depression and anxiety, reduced self-esteem, which amplify the likelihood of health-destructive behaviors such as smoking, lack of exercise and unhealthy diet. Consequently, this will lead to uncontrolled blood sugar and to the development of complications (Chih-Cheng & et al., 2012).

If the role of social determinants of health is not significantly addressed in diabetes management, they will continue to be a barrier to the improvement of health of diabetic patients and it will lead to early development of complications that badly affect the quality of life of diabetic patients and increase the mortality and morbidity of those patients.

1.3Justification

The number of patients with type 2 diabetes in Gaza strip is increasing dramatically in the last years. The number of registered diabetic patients at UNRWA health centers in 2016is 40.699;about 95% have type 2 diabetes (UNRWA, 2016).The economic burden of the disease is very high; the average medical expenses for patients who have type 2 diabetes are nearly twice as high as those for patients who do not have diabetes (Hill, 2013).

Many researchstudies were conducted in Gaza Strip demonstrated the contribution of the clinical factorsand behavioral factors to the prevention and management of type 2 diabetes but none of these studies address the role of social determinants of health on the control of diabetes. If future interventions neglect the social factors in the control of diabetes, they will fail to address the necessary population based interventions that are essential to mitigate the incidence and long-term effects of this disease for the patients and for society. This study will help health care providers to improve the quality of care they provide for diabetic patients by considering the role of psychological and the social factors in the management of diabetes. In addition, this study may help policy makers in the allocation and organization of the resources to improve the quality of life for diabetic patients and improve their control status. Finally will guide the researchers to conduct more researches studying the relationship between social determinants and other chronic diseases to decrease the mortality and morbidity from such diseases.

Since we are responsible for improving the health of our population, this study is important to fill the gap and may improve the health outcomes of diabetic patients and improve their quality of life.

1.4 General objective of the study

The general objective ofthis study is to assess the relationship between the social determinants of healthandcontrol status among type2 diabetic patients at UNRWA Health Centers in Gaza Strip.

1.5 Specific objectives

- To identify the relationship between socio-demographic variables and the control statusof type 2 diabetes.
- To recognize the effect of health behavior on the control status among type2 diabetic patients.
- To assess the relationship between health care providers characteristics and the control status among type2 diabetic patients.
- To explore the relationship between social support and control status among type 2 diabetes.
- To ascertain the differences of social determinants of health in relation to patients' characteristics (gender, age, education level and living conditions).
- To develop recommendations based on the results of this study for the propercontrol of blood sugar among type2 diabetic patients in the light of social determinants.

1.6 Research questions

1) What are the social determinants of health that can affect the control status of type 2diabetic patients?
2) How could the social determinants of health affect the control statusof type 2 diabetic patients?
3) What is the relationship between the socio-demographic variables and HBA1c?
4) What is the relationship between the income, years of education and unemployment among type 2 diabetic patients and control of blood sugar?
5) Is there a relationship between housing, living conditions, age and gender and controlstatus of blood sugar?

6) Is there a relationship between health behavior and the control status of type 2 diabetes?
7) Does obesity affect the control status of type 2 diabetic patients?
8) What is the relationship between health care provider characteristicsand the control status of blood sugar among type 2diabetic patients?
9) Couldpsychological distress affect the control status oftype 2 diabetic patients?
10) Does social support affect the control statusoftype 2 diabetic patients?
11) Are there significant differences of social determinants of health in relation to patient's characteristics such as gender, education level or living conditions?

1.7 Context of the study:

1.7.1 Political and economic context of study

Years of socioeconomic decline, conflict and closure have left the health sector across the Gaza Strip lacking adequate physical infrastructure and training opportunities. Facilities are overstretched, and service is frequently interrupted by power cuts. These challenges further threaten the health of the population, which is already at increasing risk. Food insecurity and rising poverty mean that most residents cannot meet their daily caloric requirements, while over 90 per cent of the water in Gaza has been deemed unfit for human consumption (UNRWA, 2016).

Among the severe consequences of the continuous siege on the health sector are: recurrent power cuts and an unstable power supply affect medical care. The functionality of medical equipment is deteriorated because of inadequate maintenance capacity and spare parts and the percentage of out of stock essential drug and medical disposable items keep the health service delivery in Gaza at the risk of collapse. Although the movement of people in and out of Gaza is heavily restricted, the insufficiencies of Gaza's health system force a high number of patients to leave the Strip for specialized treatment in the West Bank including East Jerusalem, Egypt, Israel and Jordan (WHO, 2014).

The availability and also the quality of essential services has been deteriorated as a consequence of these restrictions, leading to large gap in the access to quality health care, education, electricity, water, sanitation and other vital services. This bad situation has been exacerbated by the rapid population growth and damage to infrastructure by recurrent hostilities, which led to high level of poverty and food insecurity (UN OCHA, 2013).Data from the Palestinian Central Bureau of Statistics (PCBS) revealed that the poverty rate in

Gaza Strip was 38.8% in 2011, 12.9% live in deep poverty, also unemployment rate is very high,(41.7%) of Palestinian population were unemployed (PCBS, 2016).

1.7.2 Demographic context

The total population of Palestine at mid-2017 was about 4.95 million, 2.52 million males and 2.43 million females. The estimated population of Gaza Strip totaled 1.94 million, of which 988 thousand males and 956 thousand females. The percentage of urban population at mid-2017 was 73.9% while the percentage of population in rural or camps areas were 16.6% and 9.5%(PCBS, 2017). Population density in Gaza Strip is 5,324 person /km compared to lower population density in the West Bank of 532 persons/km at mid-2017.According to the results of Multiple Indicator Cluster Survey (MICS) 2014, the total fertility rate in Palestine has declined to 4.1 birth 2011-2013; in Gaza Strip, it was estimated to be 4.5 birth in 2011-2013 (MOH, 2015).Population projections revealed that crude birth rate in Palestine is expected to drop from 30.9 births per 1000 of the population in 2016 to 29.0 births per 1000 in 2020. On the other hand, the crude death rate is expected to decline from 3.5 deaths per 1000 of the population in 2016 to 3.4 deaths per 1000 in 2020 in Palestine (PCBS, 2017).

1.7.3Social context of the study

Gaza Strip is suffering from the blockade for 10 years, which devastated the economy of Gaza Strip and restricted people from essential services such as health care services and education and isolated Gaza Strip from the West Bank.More than 43% of people in Gaza are now unemployed, which is the highest unemployment in the world. 80% of people depend on humanitarian aids, although food is available, prices are too high for poor households; food insecurity levels are estimated at 57% (PCBS, 2016).

The education sector is also struggling: classrooms are acutely overcrowded and 70% of schools operate double or triple shifts, which compromise educational quality. Electricity is available only part of the day and almost no piped water meets drinking water standards due to seawater and sewage water contamination and ground pollutants.Exports fell to less than 15% with severe restriction of transfer of agricultural products to outside Gaza Strip (WHO, 2014).

1.7.4 Health context of the study:

In Gaza Strip, there are four main providers for health care, providing primary, secondary and tertiary health care: Ministry of Health, UNRWA, Palestinian Non-Governmental Organizations, and private sector(MOH, 2014). Health services are financed through a mixture of taxes, health insurance premiums, copayments, out of pocket payment, local community financial and in kind donations. The Health care system is fragmented with poor coordination between providers, closure, segregation, restriction of movement prevent access to care (Health Cluster, 2014).

Secondary and tertiary care is mainly provided by MOH, because of the very bad socioeconomic conditions, poverty and the extension of free health insurance, the cost has risen significantly, and this increase not matched with the capacity of MOH, causing deterioration of the quality of care. This situation pushes for early discharge and poor handling over and follow up of cases, which make the clients more susceptible to complications and affect their quality of life, especially at the time of emergency (Health Cluster, 2014).

On the other hand, there is under use of NGOs and private sector services, which is an indicator of poor coordination between different providers. There is shortage of tertiary care and it depends mainly on NGO, it is not well organized, many cases are referred abroad with very high cost, increasing the burden on the system.

One of the main health providers in Gaza Strip is UNRWA, which has been established by United Assembly after 1948 war, the mission of UNRWA is to help the Palestinian Refugees to achieve their full potential in human development pending a solution for their plight (UNRWA Annual Report, 2016). UNRWA provide health care, education, social and emergency services. Regarding health services UNRWA provides primary health care services to the Palestinian refugees in five fields (Gaza, West Bank, Syria, Lebanon, Jordan). In Gaza Strip, UNRWA has 22 clinics in the five Governorates, Rafah, Khanyounis, North Gaza, Middle Camps and Gaza (UNRWA, 2016).

UNRWA implemented the family health team approach in the year 2013, so the same doctor treat all family members to enhance the relationship between the doctor and his patients and make the doctors more oriented to all aspects of patient's illness to improvethe quality of care provided. In addition, UNRWA adopted the E-health approach at the end of the year 2013 and this had a major impact on the quality of care provided, improved the

reporting system and enhanced accountability (UNRWA, 2015). The health care services provided by UNRWA include maternal, children and non-communicable disease services to ensure access to quality health care, protect and promote the health of Palestinian refugees.

The health system in Gaza has also been weakened by widespread damage to medical facilities and personnel, and chronic shortages in basic supplies of drugs, disposables and equipment, so these social factors collectively have an impact on Palestinians' health and psychology, especially those have chronic disease such as diabetes (WHO, 2014).

In 2016, the number of maternal deaths recorded in Palestine were18 cases, including 9 in West Bank and 9 in Gaza Strip. Reported maternal mortality rate (MMR) in Palestine in 2016 was13.8 per 100,000 live births; 12.4 per 100,000 live births in West Bank and 15.5 per 100,000 live births in Gaza Strip. Reported infant mortality rate in Palestine in 2016 was 10.5 per 1,000 live births. In 2015, the infant mortality rate was 10.9 per 1,000 live births.

Major Causes of death in Palestine in 2016 was cardiovascular diseases, whichremains the leading cause of death among Palestinians, accounting for 30.6% of deaths recorded in 2016, cancer was the second leading cause of death, with 14.0% of deaths and cerebrovascular diseases were the third leading cause of death, with 12.8% of causes leading to death (PCBS, 2016).

1.8 Operational definitions of the study variables

1.8.1 Type 2 diabetic patients

Patients have type 2 diabetes for one yearor more and have (NCD) file in United Nations Agency for Relief (UNRWA) clinics.

1.8.2 Social determinants of health

Social determinants of health are the conditions and the environment in which the individual born, live, grow, and die and the health system in place that care of those individuals. It includes four major domains: socio-demographic variables, health behavior, health provider characteristics and social support

1.8.3 Control status of diabetes

Control status of diabetes is defined as HbA1c equal or less than 7%.

1.8.4Uncontrolled status of diabetes

Uncontrolled status of diabetes is defined as HBA1c more than 7%.

1.8.5 Sociodemograohic variables

Sociodemographic variables depends on a combination of variables, including age, sex, occupation, education, housing , income,and living conditions.

1.8.6 Health behavior

Health behavior in this study means the life style that the individual live. These behaviors include day-to-day monitoring of blood sugar, adherence to medication, smoking,obesity, healthy nutrition, taking medication at the proper time, and finally physical exercise.

1.8.7Social support

Social Support is the feeling or experience of having others who love and care for you, who you can turn to for help in times of need. Support may come in the form of social, emotional or simply a friend who listens or gives advice.

1.8.8Health care provider approach

The researcher defined health care provider characteristics as listening to the patients by the health care provider, eye contact with the patient, counseling, clarification complex issue and giving enough time

Chapter 2

Conceptual Framework and Literature Review

2.1 Conceptual framework

The conceptual framework designed by the researcher based on the review of the available literature.

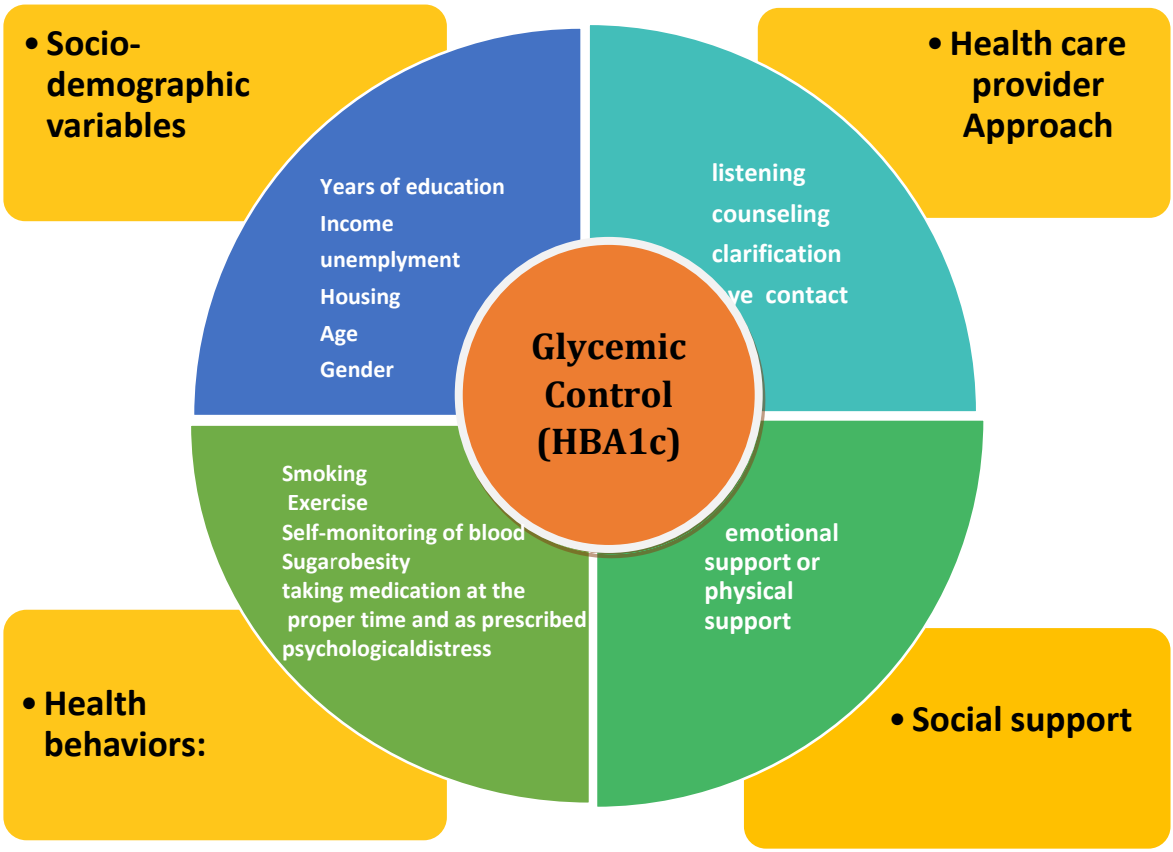

Figure (2.1) Diagram of conceptual framework

Self-developed Model

In this study, the researcher studied the impact of different social determinants of health on the control of type 2 diabetes. Social determinants of health are the conditions and the environment in which the individual born, live, grow, and die and the health system in place that care of those individuals.

The dependent variables of this study is the control of type 2 diabetes; the independent variables are the social determinants of health.It was divided in to 4 major domains: socio-demographic factors, health behavior, health provider approachand social support. In each domain, there are variables, and each of them was studied individually.

Socio-demographic variables

Socio-demographic variables of diabetic patients include age, sex, occupation, education, marital status, income, housing living conditions. All of these factors could have an effect on the control status of diabetic patients. These factors play a role in the access to the care, adherence to treatment, level of stress and the quality of life.

Health behavior

Health behavior is a cornerstone for self-management of type 2 diabetes, important components of self-management include maintaining a healthy diet, participating in regular physical activity, achieving and maintaining a healthy body weight, limiting alcohol intake, and quitting smoking. Because the complexity of diabetes management requires that health, professionals work collaboratively with their patients.Self-management support has become a critical element for effective diabetes self-management(Cyclase & E Gee, 2013).

Health provider characteristics

Communication between patient and provider can play a major role in the effective delivery of health care. A supportive consultation environment with a warm and caring provider and good patient- provider interaction is important in the management of chronic diseases such as diabetes. There is considerable evidence that patients do not follow the optimal management regimen due to reasons related to the nature of patient- provider relationships.

The quality of care remain sub-optimal worldwide regardless of the country's level and the efficiency of health care system in it. The management of type 2 diabetes depends mainly on the efforts of the providers to influence patients to adopt healthy behavior and adhere to treatment (Abdulhadi & et al., 2006).

Social support

Patients' efforts to maintain and adhere properly to diabetes management directives often take place in social settings and can alter family and social dynamics. According to research studies support from friends and family promotes adherence by encouraging optimism and self-esteem, which can buffer the stress of being ill and reduce patient depression. While social support can influence the ability to adjust and live with illness, some empirical studies have reported opposite findings, such that social support can be a significant barrier to patients' self-management. The extent to which social support affects health outcomes and adherence to diabetes treatment has important implications for both policy and practice (Miller & Robin, 2013). The purpose of this study is to know the impact of social support on adherence to diabetes treatment and the control of blood sugar

2.2 Theoretical definition of study variables

2.2.1 Type 2 diabetes

Type 2 diabetes (formerly called non-insulin-dependent or adult-onset) results from the body's ineffective use of insulin. Type 2 diabetes comprises the majority of people with diabetes around the world, and is largely the result of excess body weight and physical inactivity (WHO, 2016).

2.2.2 Social determinants of health

The social determinants of health (SDH) are the conditions, in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems(WHO, 2017).

2.2.3 Hemoglobin A1c

The term HBA1c refers to glycated hemoglobin. It develops when hemoglobin, a protein within red blood cells that carries oxygen throughout the body, joins with glucose in the blood, becoming 'glycated'. By measuring glycated hemoglobin (HBA1c), clinicians are able to get an overall picture of what our average blood sugar levels have been over a period of 12 weeks or 3 months (Diabetes.CO.UK, 2018).

2.2.4 Socio-demographic variables

Socio-demographic variables related to individuals and their living conditions, it include age, sex, education, migration, background and ethnicity, religious, marital status, housing conditions, employment, and income (America Essential Hospitals, 2016). Different index variables are formed in the basis of socio-demographic variables such as income and occupation.

2.2.5 Health behaviors

Health behavior is the behavior of individuals in their daily life, which could have an effect on their health. Health behavior includes self-monitoring of blood glucose, physical exercise, smoking, healthyfood, controlling of obesity and body weight and taking medication at proper time and as prescribed (Agborsangaya & et al, 2013).

2.2.6 Psychological distress

Stress is a state of emotional strain or tension that occurs when we feel that we cannot cope with pressure.It was suggested that stress might impair glucose control through different pathways such as behaviors, reduction in the adherence to medications, smoking, lack of exercise, consumption of unhealthy diet and hormonal pathways(American Diabetes Association, 2013).

2.2.7 Health provider approach

Professional health care providers are good communicators. They are able to truly listen to their patients, empathize, and provide information about diagnosis and treatment in a way their patients will understand. Good healthcare professionals also have a strong sense of service, of wanting to help people feel better, making health care work better, and, in many cases, giving feedback to their communities (Pamona College, 2018).

2.2.8 Social support

Social support: is the perception and actuality that one is cared for, has assistance available from other people, and that one is part of a supportive social network. These supportive resources can be emotional (e.g., nurturance), tangible (e.g., financial assistance), informational (e.g., advice), or companionship (e.g., sense of belonging) and intangible (e.g., personal advice).

Support can come from many sources, such as family, friends, pets, neighbors, coworkers, organizations. (https://www.scribd.com/document/102338518/Social-Network-Support, 2017).

2.3 Literature review

2.3.1 Type 2 diabetes

Diabetes is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood sugar. Hyperglycemia, or raised blood sugar, is a common effect of uncontrolled diabetes and over time leads to serious damage to many of the body's systems, especially the nerves and blood vessels (WHO, 2017).

In 2009, diabetes mellitus was the seventh leading cause of death in the United States. (Franciso , Jose, & Josef, 2010). In addition, diabetes is a contributing cause of death in many cases, and it is probably under-reported as a cause of death. Overall, the death rate among people with diabetes is about twice that of people of similar age but without diabetes(CDC, 2017).

Type 2 diabetes mellitus occurs most commonly in adults aged 40 years or older, and the prevalence of the disease increases with advancing age. Indeed, the aging of the population is one reason that make type two diabetes mellitus increasingly common. Virtually all cases of diabetes mellitus in older individuals are type 2. However, the incidence of type 2 diabetes is increasing more rapidly in adolescents and young adults than in other age groups, due to sedentary life style particularly obesity and low physical activity (Lancet, 2004).

Type 2 diabetes is characterized by a combination of peripheral insulin resistance and inadequate insulin secretion by pancreatic beta cells. Insulin resistance, which has been attributed to elevated levels of free fatty acids and pro-inflammatory cytokines in plasma, leads to decreased glucose transport into muscle cells, elevated hepatic glucose production, and increased breakdown of fat. For type 2 diabetes mellitus to occur, both insulin resistance and inadequate insulin secretion must exist. For example, all overweight individuals have insulin resistance, but diabetes develops only in those who cannot

increase insulin secretion sufficiently to compensate for their insulin resistance(Unger, 2010) .

About 90% of patients who develop type 2 diabetes mellitus are obese. However, a large, population-based, prospective study has shown that an energy-dense diet may be a risk factor for the development of diabetes that is independent of baseline obesity; their insulin concentrations may be high, yet inappropriately low for the level of glycaemia related to the high fat diet (Jing, Robert, Tee, Shiella , & Nicolas , 2008).

Other factors also play a role in the incidence of diabetes such as genetic factors, some genetic variants associated with beta cell function and insulin resistance (Wheeler & Barroso, 2011). In addition, an in utero environment resulting in low birth weight may predispose some individuals to develop type 2 diabetes mellitus(Hectors, 2011).

1. Major risk factors for diabetes

The major risk factors for type 2 diabetes mellitus are the following(Longman, 2016):

- Age greater than 45 years (though, as noted above, type 2 diabetes mellitus is occurring with increasing frequency in young individuals)
- Weight greater than 120% of desirable body weight
- Family history of type 2 diabetes in a first-degree relative (e.g., parent or sibling)
- Hispanic, Native American, African American, Asian American, or Pacific Islander descent
- History of previous impaired glucose tolerance (IGT) or impaired fasting glucose (IFG)
- Hypertension (>140/90 mm Hg) or dyslipidemia (HDL cholesterol level < 40 mg/dlor triglyceride level >150 mg/dl)
- History of gestational diabetes mellitus or of delivering a baby with a birth weight of over 4 kilos
- Polycystic ovarian syndrome (which results in insulin resistance)

Many diabetic patients are asymptomatic but others develop the following symptoms:

Polyuria, polydipsia, blurred vision, lower limbs pain or paresthesia, recurrent fungal infection, others diagnosed by the signs of diabetic complications.

2. Classification and diagnosis of diabetes

Diabetes is classified as:

- Type 1 diabetes.
- Type 2 diabetes.
- Gestational diabetes.
- Others.

Diagnosis of diabetes according to the American Diabetic Association include the following:

- Fasting Plasma Glucose (FPG) of 126mg/dlor more in 2 separate occasions.
- Or Oral Glucose Tolerance Test(OGTT) of 200 mg/dl.
- Or Random Plasma glucose (RPG) of 200 mg/dl or more in patients with classic symptoms of hyperglycemia.
- Or HBA1c more than 6.5% (it is a point of controversy).

Screening is the best cost effective methods to diagnose diabetes and properly manage the cases before the development of complications; indications for diabetes screening in asymptomatic adults include the following:

- Age more than 45 without any other risk factor
- High blood pressure more than 135/80 hg
- Obesity or overweight with one or more of the risk factors for diabetes
- Family history of diabetes
- Hyperlipidemia HDL (high-density lipoprotein) less than 35, triglycerides more than 250 mg/dl or cholesterol more than 200 mg.

3. Diabetes Complications

Diabetes mellitus causes morbidity and mortality because of its role in the development of cardiovascular, renal, neuropathic, and retinal disease. These complications, particularly cardiovascular disease (approximately 50-75% of medical expenditures), are the major sources of expenses for patients with diabetes mellitus (CDC, 2016).

Although the pathophysiology of the disease differs between the types of diabetes, most of the complications, including microvascular, macro-vascular, and neuropathic, are similar regardless of the type of diabetes. Hyperglycemia appears to be the determinant of microvascular and metabolic complications. Macro-vascular disease may be less related to hyperglycemia.

The most common and serious complications that diabetes can cause are:

a. Diabetic retinopathy

Diabetes mellitus is the major cause of blindness in adults aged 20-74 years in the United States; diabetic retinopathy accounts for 12,000-24,000 newly blind persons every year. The National Eye Institute estimates that laser surgery and appropriate follow-up care can reduce the risk of blindness from diabetic retinopathy by 90% (National Institue for Diabetesand digestive and kidney Disease, 2011) .

b. End-stage renal disease

Diabetes mellitus, and particularly type 2 diabetes mellitus, is the leading contributor to end-stage renal disease (ESRD).According to the Centers for Disease Control and Prevention, diabetes accounts for 44% of new cases of ESRD (CDC, 2017).

c. Neuropathy and vasculo-pathy

Diabetes mellitus is the leading cause of non-traumatic lower limb amputations, with a 15- to 40-fold increase in risk over that of the nondiabetic population (NIDDK, 2011).

d. Cardiovascular disease

The risk for coronary heart disease (CHD) is 2-4 times greater in patients with diabetes than in individuals without diabetes. Cardiovascular disease is the major source of mortality in patients with type 2 diabetes mellitus. Approximately two thirds of people with diabetes die of heart disease or stroke. Men with diabetes face a 2-fold increased risk for CHD, and women have a 3- to 4-fold increased risk (lwrence , Wackness, & Steeven, 2009). Cardiovascular risk increases in people with diabetes is related in part to insulin resistance, with the following concomitant lipid abnormalities:

- Elevated levels of small, dense low-density lipoprotein (LDL) cholesterol particles
- Low levels of high-density lipoprotein (HDL) cholesterol
- Elevated levels of triglyceride-rich remnant lipoproteins

Increased cardiovascular risk appears to begin prior to the development of frank hyperglycemia, presumably because of the effects of insulin resistance(NIDDK, 2011).

4. Treatment of Diabetes

Treatment of diabetes usually depend on the age, weight and the glucose level. The first line of treatment of diabetes is usually by life style modification such as diet and physical exercise. If life style modification failed, oral hypoglycemic agents should be initiated. There are many types of oral hypoglycemic agents; the dose of it will be modified according to the response to treatment. The last line and the gold standard for managing diabetes is insulin, which is given as subcutaneous injections(Mayo-clinic, 2018).

2.3.2Social determinants of health

Health starts from our homes, schools, workplaces and our communities. Taking care of ourselves means eating well , staying active , not smoking, having the proper immunizations and the screening tests, and visiting a doctor when feeling sick, all of these factors could influence out health. Our health could also be determined by social, or economic factors; the resources available in our homes, neighborhood and communities, the quality of our schools, the safety of our workplaces, the quality of our foods, the cleanness of the water we drink, and the quality of the air we breathe. All of these conditions can explain in part our health conditions.

Social determinants of health are the conditions in the environment in which people are born, live, learn, work and age that affect a wide range of health, functioning, and quality of life outcomes and risks. The social, economic and physical conditions in these environments and settings such as schools and workplace have been referred to place. However, the patterns of social engagement and sense of security and wellbeing are also affected by where people live. The resources that enhance the quality of life can have a significant influence on the health outcomes of populations; Examples of these resources include safe and affordable housing, access to education, public safety, availability of healthy diet, stress, and exposure to hazardous materials such as smoking(CDC, 2017).

In 2008, WHO highlights the importance of closing the gap in a generation and to develop health equity through action on the social determinants of health (WHO, 2013)

Working on the social determinants of health is to create social and physical environment that promote the health for all. All individual deserve an equal opportunity to make the choices that lead to good health. However, to ensure that, advances are needed not only in health care but also in other fields such as education, childcare, housing, business, law, media, transportation, and agriculture.

The examples for the social determinants of health include:

- The availability of resources needed to meet daily needs such as housing and local food markets
- Access to education and job training.
- Access to health care services
- Transportation options

- Social support
- Public safety
- Social norms and attitudes (gender discrimination or racism)
- Availability of community based resources for recreation and leisure time activities
- Exposure to crime and social disorder
- Language or literacy
- Socioeconomic conditions

In addition to this, the physical determinantsthat include:

- The natural environment such as green space or weather.
- Built environment such as buildings, sidewalks, and roads
- Worksites, schools
- Housing and community design.
- Exposure to toxic substances and physical hazards

Working to establish policies that positively influence social and economic conditions and those that support changes in individual behaviors, can improve health for large numbers of people in ways that could be sustainable over time (Healthy People, 2014).

Why to care about social determinants of health?

Improving the social determinants of health can improve the health of individuals and consequently improving the health of communities. They intended to change individual behavior by providing opportunities and knowledge that can make it easier for people to adopt healthy life styles such as quit smoking, get more exercise, eating healthier food, or got screening and early detection of their diseases. These efforts can certainly lead to better health outcomes(Community Tool Box, 2017).

There are different models developed by health organizations that help in addressing the important social determinants of health in our communities. One of these models was developed by U.S. Centers for Disease Control and Prevention. The models promote inclusiveness, community participation, and careful assessment, planning implementation, evaluation and maintenance of efforts. The model composed of 5 phases, which are: to create or enhance partnerships, focus of partnerships on social determinants, build community capacity to address social determinants, select an approach to create, and move to action.

In most communities and societies, some people have better access to health care and live in healthier environment than others live. Therefore, they are generally healthier and live longer than others with fewer advantages. In most cases, the differences are caused at least partially by the social conditions such as income, education, discrimination, policies and geography rather than by genes or luck. When the living and the surrounding conditions are unequal, they will cause health inequity. When these conditions are equally distributed, we can develop healthier communities and improve the quality of life for all (Brennan, Baker, & Metlezer, 2008).

A numberof studies assessed the impact of social determinants on health. A review study conducted by McGinnis showed that medical care is responsible only for 10-15% of preventable mortality in USA(McGinnis & Williams, 2002).

The Robert Wood Johnson Foundation in United States sets out how social factors are importnant as medical care on health and it argues leaders across the United States to shift funding priorities to improve 3 areas essential to improve the nations health: focusing to increase access to early childhood development programs, revitilizing low income neighborhoods, and broadining the mission of health care providers beyond medical care(Mormot & Allen, 2014). An English review was conducted in 2010. It enlisted 80 experts and set out a large evidence base:

It demonstrated the most important influences on health and health inequalities in six priority areas, most of them was not in health care but in the access to the care.

The six priority areas were: quality of experiences in the early years, education and building personal and community resilience, good quality employment and working conditions, having sufficient income to lead a healthy life, healthy environments, and priority public health conditions—taking a social determinants approach to tackling smoking, alcohol, and obesity (Marmot Review, 2010).

2.3.3 Social determinants of health and diabetes

A systematic review study was conducted to examine current understanding of the social determinants affecting diabetes and health.Study findings indicate that external or upstream factors prominently affect individuals diagnosed with diabetes, in part by influencing self-management and in turn exerting lasting effects on long-term diabetes and health outcomes(Clark & Utz, 2014).

Although various studies have addressed the relation between the social determinants and development of disease or chronic conditions such as diabetes mellitus, cardiovascular disease and cancer, the pathways through which these determinants affect health is poorly understood. Although many therapies are available for managing diabetes and preventing or treating its complications, these therapies are underutilized and not always effective, as there are other factors affect the health of diabetic patients other than medical treatments. Those factors are the social determinants of health (Gonzalez-Zacarias, 2016).

The relationship between the social determinants and the health of diabetic patients ; may be related knowledge, communication with providers, ability to adhere to recommended medications, exercise, dietaryregimens and treatment choices (Barnard, Clar, & Cummins, 2010).Correspondingly, working on the social determinants of health may have a profound impact on the morbidity and mortality associated with diabetes(Fox & Mier, 2009).

In this study, the researcher present thepossible mechanisms linking the social determinants of health to the health of persons with diabetes mellitus.

2.3.4 Socio-demographic variables

Socio-demographic variables are variables related to the individuals and their living conditions, it include age, sex, education, migration, background and ethnicity, religious, marital status, housing conditions, employment, and income. Different index variables are formed in the basis of socio-demographic variables. These variables could be for example, socio-economic status, which may depend on education and income (Gesis, 2010).

Evidence suggests a relationship between age and sex in the health outcome among diabetic patients especially on the development of complication(Hua-Fen Chen, 2006).

In addition,education, income, occupation and housing can badly affect the outcome of diabetes. Mostliterature shows that the lower the socioeconomic condition, the more unfavorable the prediction for the development of stable health(Azar Tol, 2013).

The literature shows that low income, poor housing or less secured occupation with no health insurance may be associated with higher rates of smoking, lower rates of blood glucose monitoring, and poor control of diet. All of these preceding factors will lead to poor control of blood glucose and early development of complications (Walker, 2104).

The sociodemographic variables that are included in this study are, socioeconomic level , income, age, sex, work, education and living conditions.

1. Socioeconomic level

Socioeconomic level and health

Socio-economic status depend on a combination of factors include occupation, education, income and wealth. Sociologists often use socioeconomic as a means of predicting the behavior of individuals.

A study was conducted to analyze the relationship at the household level for Fiji, a developing country in South Pacific, to assess the relationships between socioeconomic status (SES) and having illness, using the data from household survey, the researchers measured SES as a permanent income which was constructed using principal component analysis. They found that 1 % increase in the wealth (income) would lead to 15% decrease in the probability of having illness; the strongrelationship indicates that small improvement in SES can significantly improve health.(Lordan & Soto, 2012)

Socioeconomic level and type 2 diabetes

A study was conducted in China to determine whether socioeconomic level is associated with control of type 2 diabetes, blood pressure, blood cholesterol and diabetic complications in Chinese adults with type 2 diabetes. Analysis of data with multivariate logistic regression was done and it showed that the least educated patients had the highest chances of developing cardiovascular disease, cerebrovascular disease, and retinopathy.

The patients with the highest household income were more likely to achieve BP less than 140/90 but less likely to reach HbA1c less than 7% than those with the lowest income. The conclusion of the study was that low socioeconomic level was associated with poor metabolic control and more diabetes complication in adult patients (Xiaoming & Xiaolin, 2016).

Health Services Research conducted a research to study education, income and immigration as risk factors for high HbA1c when diagnosed with type two diabetes or latent autoimmune diabetes in adults. The conclusion of the study was: patients with lower levels of education or low income are more likely to have HbA1c more than 8.6% when diagnosed with type diabetes (Matts , Ronnie, & Lief, 2017).

2. Gender

A systematic review study was conducted to discuss the gender differences among diabetic patients. The study observed that male patients could live more effectively with diabetes, lesser depression and anxiety and more energy and positive wellbeing. They are more satisfied with the management of their disease and experience lesser social worry. Gender differences become crucial when one has to learn to live effectively with diabetes. Female patients need to develop a more positive attitude towards their disease and its management. This is very important, especially in those who are responsible for tasks such as taking care of their families and cooking, which make it difficult for them to follow their medication and practice physical exercise and check blood sugar and eating schedules(A Siddique, khan, & Careline, 2013).

Another systematic review study was conducted to determine the impact of gender on glycemic control and hypoglycemia in insulin treated patients with type 2 diabetes. Data were pooled from six randomized clinical trials on insulin treated patients. The study showed significant differences in the level of HBA1c between both sexes, women has higher level of HBA1c and usually need higher dose of insulin (Willer & Kousy, 2015).
Women make greater use of diabetes services and have a larger network of people with whom to discuss medical problems. Women also report more illnesses than men do, however, women appear to be more knowledgeable about and sensitive to the symptoms of diabetes, and seek care more frequently than men. Some of these differences may have evolved from the different roles that men and women traditionally have played within the family structure, with women having greater responsibilities for family health. All of these preceding interpretations may lead to better control of blood sugar among diabetic women.

Another cross-sectional study was conducted in a sample of 87.284 patients to evaluate whether HBA1c levels are affected by hemoglobin level and gender. The study showed that women had a lower mean HBA1c value compared with men, also there was gender specific association between age and HBA1c (Chole, Muge, & Shuguan, 2013).

Conversely, another study showed that men and women have different illness orientations. Women are more sensitive to illnesses, more able and likely to rest during an illness, and more willing to seek medical advice, they found that women have a greater interest and

concern for diabetes and were more likely to perceive symptoms, but there was no difference of HBA1c level in both sexes (Anderson & Oh, 1993).

3. Age

People worldwide are living longer. Today, for the first time in history, most people can expect to live into their sixties and beyond. By 2050, the world's population aged 60 years and older is expected to total 2 billion, up from 900 million in 2015. Today, 125 million people are aged 80 years or older. By 2050, there will be almost this many (120 million) living in China alone, and 434 million people in this age group worldwide. By 2050, 80% of all older people will live in low- and middle-income countries.

At the biological level, aging results from the impact of the accumulation of a wide variety of molecular and cellular damage over time. This leads to a gradual decrease in physical and mental capacity, a growing risk of disease, and ultimately, death. However, these changes are neither linear nor consistent, and they are only loosely associated with a person's age in years. While some 70 year-olds enjoy extremely good health and functioning, other 70 year-olds are frail and require significant help from others(WHO, 2015).

Age and type 2 diabetes:

Across-sectional study for adults who are known to have diabetes or impaired glucose tolerance showed that HBA1c levels increase with age even after adjusting the other covariates including the race, BMI, waist circumference, triglycerides (Diabetes In Control, 2014).

Another cross sectional analysis was conducted in adults known to have diabetes to determine whether using HBA1c for screening and management could be affected by age differences. The results of the study was that blood glucose tolerance and HBA1c increased with age. A multivariate analysis was done and it showed that the relationship between age and HBA1c remained significant after adjusting other covariates including race, BMI, and glucose level (Doubeuez & Xue, 2014).

4. Housing

Housing conditions can remarkably affects the health of individuals and populations; there is a scientific evidence that there are many links between housing and health in the recent decades. This evidence can be used as a guidance for primary preventive measures related

to housing construction, renovation, use and, maintenance which can promote the health of individuals.

A study was conducted to determine the association of food insecurity, cost-related medication, housing instability and energy insecurity with control of diabetes mellitus and the use of health care resources. The study was cross sectional, conducted in primary health care clinics, and 2-community health centers, a random sample of 411 patients were selected having diabetes mellitus. The results of the study showed that housing instability and energy insecurity were associated with increased outpatient visits but not with diabetes control. An increasing number of insecurities was associated with poor diabetes control.
The conclusion of the study was that material need insecurities may be important targets for improving care of diabetes mellitus (Seth, James, & Darren, 2015).

5. Education level

Education level is important and critical to social and economic development and has large effects on the population health. Now it has widely recognized that the health outcomes are largely influenced by a variety of social factors outside of health care. The large differences in morbidity, mortality and risk factors that have been documented within and between countries are patterned after classic social determinants of health such as education and income.
One of the various social determinants of health that explain health disparities is education. Research based on large experience in developing world has identified educational status (especially the mother) as a major predictor of health outcomes.
In the United States, the gradient of health outcomes by educational level has steepened over the last four decades in all regions of United States producing large gap between health status between Americans with low and high education level (Zemmirman & Woolf, 2014).

Education and diabetes:

A study was conducted by Dr.Al Rasheedi to evaluate the impact of the educational level on glycemic control among patients with type 2 diabetes mellitus. The study showed that the education level have no impact on glycemic control, but the patients of high education level had better awareness of the complications and a high rate of adherence to diet. About 70.5% of patients were aware of two or more diabetic complications.

The factors associated with poor control included increased duration of diabetes, use of insulin and oral hypoglycemic agents combination, being obese or overweight, poor adherence to diet, poor adherence to exercise and poor compliance with follow up. This study found a high rate of poor adherence to diet (68%) and poor adherence to exercise (79.4%)(Ali & Al Rasheedi, 2014).

The proportion of patients with poor glycemic control was high in this study;it showed that educational level might not be a good predictor of better therapeutic compliance. In-spite of the significant importance of appropriate diet and exercise in the control of diabetes, there was a high rate of poor adherence to diet and exercise, especially among females. Educational programs that emphasize adherence to treatment regimens as a whole, especially to diet, exercise and to regular follow up are of greater benefit in glycemic control as compared to compliance of medications alone (Ali & Al Rasheedi, 2014).

Another research study called (Burden of type 2 diabetes attributed to lower educational levels in Sweden); the study aim was to illustrate an example by estimating the burden of type 2 diabetes in Sweden attributed to lower educational levels. The result of the study showed that 17.2% of the diabetes burden in men and 20.1% of the burden in women were attributed to lower educational levels in Sweden when combining all age groups. The conclusion was that there is a considerable burden of type 2 diabetes attributed to lower educational levels in Sweden(Emilie E AgardhEm, 2011).

Anotherliterature review study was conducted in the United States in 2014 to examine the current understanding of the social determinants of health that could affect diabetes and health. The study showed that education attainment is linked to improved health outcomes of diabetic patients possibly because of a greater likelihood of socio-economic stability compared to those with lower levels of education. Other related factors also may be derived from opportunities for better employment(Clark & Utz, 2014).

Moreover, another research study was conducted to assess the socioeconomic disparitiesin health behavior, it was also literature review study, it showed that individuals with higher education are more likely to participate in preventive health care including eating healthier food being more physically active, and avoiding obesity (Pampel & et al., 2011).

2.3.5 Health behavior

In the past, most physician and researchers thought that the diseases are caused by a single specific cause: specific agents cause specific disease, for example, an infection is caused by proliferation of single bacterial agent, while other diseases might be caused by viruses, toxins, accidents or by a genetic makeup of persons.

However, recent researches highlights the relationships between health and behavioral, psychological and social variables. The fact that stress is linked to cardiovascular disease or other health problems become commonly accepted. In addition, research studies show a reciprocal relationship between the central nervous system and the endocrine system, which produces the hormones that control body functions and the immune system, which is responsible to control diseases and infections.It has been recognized that specific behaviors are related to the increased risk of specific diseases for example, tobacco use, alcohol consumption, inadequate physical activity, and high fat, low fiber diet have been recognized as a cause of many diseases(National Academic Press, 2001).

A study was conducted to examine the extent to which treatment beliefs and health behaviors predict diabetes health outcomes by measuring HBA1c, level of blood pressure, and lipid profile. The design of the study was cross-sectional targeting population who have type 2 diabetes in the country of Fuen and Denmark. The study showed that health behaviors were stronger predictors of health outcome than treatment beliefs,self-reported adherence to either the treatment regimen or general medical advice most consistently predicted both glycemic control and cardiovascular risk factors (Arx & et al., 2016).
Also another study was conducted to examine wheather the improvement in health behaviours is associated with reduced risk of cariovascular disease in individuals with newly diagnosed type 2 diabetes, the study was prospective cohort study on 867 newly diagnosed diabetic patients aged between 40-69 years. The study showed CVD risk was inversely associated with the number of healthy behavior changes adopted in the year after the diagnosis of diabetes. Interventions that promote early achievement of these goals in patients with newly diagnosed diabetes could help reduce the burden of diabetes-related morbidity and mortality (Grainne & et l, 2104).

1. Self-monitoring of blood sugar and the control status of diabetic patients

Self-monitoring of blood sugar (SMBS) means home blood sugar testing by glucometer for people who have diabetes. The use of SMBS is the regular testing of blood sugar to

understand the control status among diabetic patients and inform the changes of blood sugar level to improve blood sugar control (Diabetes.co.uk, 2017). Self-monitoring of blood glucose is an essential tool for people withdiabetes who are taking insulin or for those who experience fluctuations in their blood glucose levels, especially hypoglycemia (Kirk & Stegner, 2010).

The benefits of SMBS are:

- Facilitating the development of an individualized blood glucose profile, which can then guide health care professionals in treatment planning for an individualized diabetic regimen;
- Giving people with diabetes and their families the ability to make appropriate day-to-day treatment choices in diet and physical activity as well as in insulin or other agents;
- Improving patients' recognition of hypoglycemia or severe hyperglycemia.
- Enhancing patient education and patient empowerment regarding the effects of lifestyle and pharmaceutical intervention on glycemic control.
- It is important during undertaking dangerous tasks, which could be influenced by high or low blood sugar, such as driving or handling dangerous machines(Banjamen, 2002).

Conversely recent systematic review from Canada suggests that patients with type 2 diabetes who are not taking insulin do not require self-monitoring of blood glucose. Type 2 diabetes is increasingly common, so there may be significant costs associated with widespread use of blood glucose testing by these patients. A Canadian review indicated that self-monitoring was associated with similarly modest improvements in HBA1c (0.25% fall) among patients with non-insulin treated type 2 diabetes. It also concluded that providing education to help patients translate results from self-monitoring tests into appropriate action did not appear to benefit patients. The review found little evidence to suggest that self-monitoring improved health-related quality of life, patient satisfaction, long-term complications or mortality (Welle, 2010).

A study was conducted to evaluate the effectiveness of self-monitoring blood glucose levels in improving glycemic control. It was cohort study; the study sample included 24,312 adult patients with diabetes who were members of a large, group model, managed care organization. They estimated the difference between HBA1c levels in patients who self-monitored at frequencies recommended by the American Diabetes Association compared with those who monitored less frequently or not at all. Results were: Self-

monitoring among patients with type 1 diabetes (≥3 times daily) and pharmacologically treated type 2 diabetes (at least daily) was associated with lower HbA1c levels (1.0 percentage points lower in type 1 diabetes and 0.6 points lower in type 2 diabetes) than was less frequent monitoring (P <0.0001). In addition, the conclusion for this study, more frequent self-monitoring of blood glucose levels was associated with clinically and statistically better glycemic control regardless of diabetes type or therapy(Karter, Ackerson, & Darbinian, 2001).

Another systematic review study conducted on 10 trials (published 1996–April 2009) comparing SMBG with no SMBG in patients with Type 2DM found a statistically significant reduction in HbA1c of 0.21% in favor of SMBG, with appropriate education provided both for patients and for health care professionals, further improvement of glycemic control is considered to be possible. Prerequisites, however, are appropriate education addressing SMBG interpretation, adjustment of nutrition and physical activity according to measurements, and the response to abnormal values of blood glucose, both for patients and for health care professionals (Schinel, Alawi, & Diem, 2013).

Conversely, in 2012 systematic review study showed that in some individuals self-monitoring of blood sugar is associated with negative psychological outcomes including depression. However, this could be because the person with diabetes was not given the education to interpret and therefore be empowered by the data (Diabetes UK, 2017).

In addition, another systematic review of 30 Randomized Control Trials showed that SMBG is of limited clinical effectiveness in improving glycemic control in people with Type2 diabetes mellitus on oral agents, or diet alone, and is therefore unlikely to be cost-effective.

SMBG may lead to improved glycemic control only in the context of appropriate education for both patients and health-care professionals on how to respond to the data, in terms of lifestyle and treatment adjustment. In addition, SMBG may be more effective if patients are able to self-adjust drug treatment.

Further research is required on the type of education and feedback that are most helpful, characteristics of patients benefiting most from SMBG, optimal timing and frequency of SMBG, and the circumstances under which SMBG causes anxiety and/or depression(Clar, Barnard, & Royle, 2010).

2. Obesity

Being overweight or obese increases the risk of developing a large number of serious diseases, such as coronary heart disease, stroke, cancer, liver and gallbladder disease, and osteoarthritis (CDC, 2017). Excess body weight has been identified an important factor in type one and type two diabetes mellitus. Obesity is a major risk factor for type 2 diabetes (Ganz & Wintfeld, 2014), and about 80% of individuals with type 2 diabetes are overweight or obese (NIDDKD, 2013).

A study using an electronic health record database was analyzed; the data was extracted from health information technology systems in medical group, andcontain laboratory results. The study aim was to determine the relationship between BMI and the control status among type 2and type 1 diabetes depending on the level of HBA1c.the conclusion of this study was for both type one and type two diabetes, there were positive and statistically significant relationship between being overweight or obese and having suboptimal glycemic control. These findings quantify the association between obesity and glycemic control, and highlight the importance of individual characteristics on glycemic control (Bae, Lage, & Mo, 2016).

Another study aimed to identify the association between obesity status and poor glycemic control; patients from diabetic clinic were recruited for the study, patients who had insulin therapy were excluded from participation. Glycosylated hemoglobin (HBA1c) was measured to estimate glycemic control, he results of the study was that poor glycemic control was observed in 63.7% of the cases and there was no correlation between obesity and poor glycemic control using logistic regression in the analysis (Razena & Reza, 2016).

3. Psychological distress and the control of diabetes

There is high evidence that psychological distress play an important role in the development and worsening of symptoms of type 2 diabetes. There are wide literature about the association between depression and type 2 diabetes, current data shows that an approximately two fold increase in the prevalence of depression among diabetic patients compared by others that are not diabetic. Moreover, depression in diabetic patients is associated with higher levels of blood glucose levels, poorer adherence to the treatment

(whether pharmacological or life style), more medical complications, and higher hospitalization rates (National Institute of Health, 2013).

Many long-term sources of stress are mental; our mind reacts to harmless events as a real threat. Like physical stress, mental stress can be short or long term. With mental stress, the body produce fight and flight hormones that affect our body (American Diabetes Association, 2013). In people with diabetes, stress can alter glucose levels in two ways:

- People with stress may do not care of themselves, they may do not exercise, drink more alcohol, forget or not have time to check their blood sugar or having the proper diet.
- Stress hormones may also alter blood glucose levels in a direct way.

Scientists noticed the effects of stress in animals and people, the effect in people with type one diabetes are mixed. While most people glucoselevels go up with mental stress, others glucose levels can go down. In people with type two diabetes mental stress often raises blood glucose levels. However, Physical stress such as illness or injury causes higher blood glucose levels in people with both type of diabetes (American Diabetes Association, 2013).

A study examined the association between cardiovascular disease risk factor control and elevated depressive mode, serious psychological distress (SPD) and diabetes distress in patients with type 2 diabetes. The study was cross sectional,conducted at an academic health center. Linear regression model were computed using cardiovascular disease and glycosylated hemoglobin HBA1c, systolic and diastolic blood pressure and low-density lipoprotein (LDL): serious psychological distress, diabetes distress, and elevated depressive mode were primary independent variable. Correlation analysis showed a significant relationship between diabetes distress and HbA1c. The conclusion of this study was diabetes distress could significantly affect the control status among diabetic patients (Whichester, Whilliams, & Wolfman, 2016).

Conversely, another study was conducted in Verona City Hospital to test the association of glycemic control with depression, anxiety self-efficacy and other psychological measures in a group of diabetic patients with type two diabetes. The study showed that the overall prevalence of anxiety and depression was 14.5% and 18.6% respectively. Higher levels of HBA1c were statically significant with p value less than 0.001with other dimensions such

as higher perceived interference with daily activities, higher perceived diabetes severity and lower self-efficacy but not depression and anxiety ((Indelacato, Duartiz, & Santi, 2017).

4. Eating habits

Diet is one of the major factors that is linked to a wide range of diseases. One of them is diabetes. The type and the amount of food is an important determinant of health, diet constitutes a major part of the overall management of diabetes, which may include diet alone, diet with oral hypoglycemic agents, or diet with insulin (Innocenti, Sofi, & et al, 2006).

A systematic review was conducted to explore the relationship between type 2 diabetes, different dietary habits/patterns, practices, and its complications. Indians observed that the disease was almost confined to rich people as they consume oil, flour and sugar in excessive amounts proposed the role of diet in the etiology of type 2 diabetes. During the First and the Second World Wars, declines in the mortality rates were documented due to shortage of food and famines in the affected countries such as Germany and other European countries. In contrast, there were no change in diabetes mortality in the other countries with no shortage of food(Ab Hamid, Sami, & Ansari, 2017). In addition, this review study suggests that Type 2 diabetic patients require reinforcement of DM education including dietary management through stakeholders (health-care providers, health facilities, etc.) to encourage them to understand the disease management better, for more appropriate self-care and better quality of life. The overall purpose of treating Type 2 diabetes is to help the patients from developing early end-organ complications which can be achieved through proper dietary management. The success of dietary management requires that the health professionals should have an orientation about the cultural beliefs, thoughts, family, and communal networks of the patients.

Recently, evidence suggested a link between intake of soft drinks with obesity and with diabetes, because it has large amounts of high fructose corn syrup used in manufacturing of soft drinks, which raises blood glucose levels and BMI to the dangerous levels (Nseir & Nassar, 2010). It was also stated that soft drinks contain glycated chemicals that markedly augment insulin resistance. Food intake has been strongly associated with obesity, not only with the volume of food but also in terms of the composition and quality of diet, high intake of red meat, sweets and fried foods, contribute to the increased the risk of insulin resistance and the risk of type 2 diabetes (B. Panajiotakos, Tazemia, & Pitsavos, 2005).

A cross sectional study conducted on 934 patients with type 2 diabetes and 918 healthy volunteers in China, they were interviewed using validated food questionnaire, the study concluded that dietary fiber might play an important role in reducing HBA1c level. Increasing fiber intake may be effective approach to improve glycemic control among Chinese diabetic patients (Junyi & et al., 2012).

Moreover, anintervention study aimed to evaluate the effects of daily consumption of a healthier snack bar on snacking habits and glycated Hb (HBA1c) within a 6-week intervention. Twenty-eight participants were randomly allocated to two groups to either consume the bars as the main snack for 6 weeks or receipt of the bars was delayed for 6 weeks following a stepped-wedge design. All participants had HbA1c concentrations measured at weeks -1, 0, 4, 6, 10 and 12. A short dietary habits questionnaire was self-completed at weeks 0, 6 and 12. Participants consumed the bars they received instead of other snacks, and found that the healthier snack bar was acceptable as part of their daily dietary pattern. Over the 12 weeks, there was a significant reduction in intake of biscuits, cakes and pies (approximately 2 servings/week, $P<0{\cdot}05$) in both groups. Fruit juice intake was reduced (approximately 1 serving/week, $P=0{\cdot}029$) in the first group. In all, twenty participants (71·4 %) experienced a decrease or no change in HBA1c, whereas eight participants experienced an increase in HBA1c. There was high compliance with the healthier snack intervention and a trend towards a favorable effect on glucose homoeostasis. Habitual snacking behavior has the potential to be improved through changes in the food supply, and in the longer term may reduce the impact of poor nutrition on public health (Yan, Persons , & Whalley , 2016).

Another systematic review study conducted by Abu Hamid revealed that dietary management is a superior option for glycemic control in type 2 diabetes mellitus. It is important to keep the HBA1c level in an acceptable range to delay the onset and progression of diabetes complications. In this review, various food groups that can have beneficial and adverse effects on HBA1c have been identified. Diabetic retinopathy stood out as the most prevalent complication of poorly managed diabetes mellitus in Saudi Arabia (Ab Hamid & Waqqas, 2016).

In addition, an inverse correlation was observed between intake of vegetables and Type 2 diabetes. Consumption of fruits and vegetables may protect from the development of type 2 diabetes, as they are rich in nutrients, fiber and antioxidants, which are considered as protective agents against the diseases. Japan Public Health Center conducted a prospective

study on Japanese women and men revealed that high intake of white rice was associated with increased risk of type 2 diabetes and affects controlling blood sugar (Nanri & et al., 2010).

5. Smoking

Cigarette smoking causes more than 480,000 deaths each year in the United States. This is nearly one in five deaths.Smoking causes more deaths each year than the following causes

- Human immunodeficiency virus (HIV)
- Illegal drug use
- Alcohol use
- Motor vehicle injuries
- Firearm-related incidents

People have died prematurely from cigarette smoking than have died in all the wars fought by the United States; in addition, smoking causes about 90% (or 9 out of 10) of all lung cancer deaths.More women die from lung cancer each year than from breast cancer.In addition, it causes about 80% (or 8 out of 10) of all deaths from chronic obstructive pulmonary disease (COPD). It is known that cigarette smoking increases risk for death from all causes in men and women.

It is documented that the risk of dying from cigarette smoking has increased over the last 50 years in the U.S(CDC, 2017).

Smoking and diabetes

Prospective cohort study included 34 patients who ceased smoking were followed for 1 year and continued not to smoke for 1 year, two control group were randomly selected, one control group were current smokers and the other group were individuals who never smoke. HBA1c was measured for all of them. The results of the study showed that cessation of smoking lead to drop of HBA1c by 0.7%;as smoking may increases insulin resistance. It is possible that cigarette smoking will affect glycosylation of hemoglobin, although no studies were found with a literature searchn addition, this could also be explained that with decision to stop smoking, they adopt change of their lifestyle and this leaded to the improvement of their HBA1c (Jenny E. Guntonm, 2002).

Another study by Dr. Debroah, it was retrospective cohort study of adult smokers with type 2 diabetes using The Health Improvement Network (THIN), a large UK primary care database.The study showed that 10692 adult smokers with type 2 diabetes were included. 3131 (29%) quit smoking and remained abstinent for at least 1 year. After adjustment for potential confounders, HBA1c increased by 0.21%, within the first year after quitting. HBA1c decreased as abstinence continued and became comparable to that of continual smokers after 3 years. This increase in HBA1c was not mediated by weight change, there was no specific explanation for this (Debroah, Lina, & and Ronan, 2015).

6. Physical exercise

A large number of cross-sectional as well as prospective and retrospective studies have found significant association between physical inactivity and type 2 diabetes mellitus. A prospective study was carried out among more than thousand nondiabetic individuals from the high-risk population of Pima Indians for 6 years; it was found that the diabetes incidence rate remained higher in less active men and women from all BMI groups.It has been suggested that physical activity increases sensitivity to insulin. In a comprehensive report published by Health and Human Services, USA, 2015 reported that physical activity enormously improved abnormal glucose tolerance when caused by insulin resistance primarily than when it was caused by deficient amounts of circulating insulin.Physical activity is likely to be most beneficial in preventing the progression of type 2 diabetes during the initial stages, before insulin therapy is required. The protective mechanism of physical activity appears to have a synergistic effect with insulin. During a single prolonged session of physical activity, contracting skeletal muscle enhances glucose uptake into the cells. This effect increases blood flow in the muscle and enhances glucose transport into the muscle cell, physical activity has also been found to reduce intra-abdominal fat, which is a known risk factor for insulin resistance (Ab Hamid, 2017).

2.3.6 Healthcare providerapproach

Effective communication between patients and providers and shared decision-making affects health behaviors and the process and outcomes of care for persons with diabetes.

Poor Communication between patients and providers may significantly decrease a patient's ability to appropriately obtain health care and may inhibit the degree to which the patient benefits from such care. Less effective communication has been observed among patients

of lower occupational status and may pose a significant barrier to good care (Brown, 2004).

Physicians are more likely to adopt a more directive approach with less-educated patients, who are then less likely to have their expectations met. Provider communication style has also been shown to influence diabetes outcomes. Patients who interact with less controlling, more informative physicians and nurses achieve better glucose control. Patients whose physicians facilitate participation in decision-making are more satisfied with their care. Moreover, satisfaction with both the effectiveness of the provider's communication and participatory decision-making styles are important predictors of diabetes self-care behavior, an outcome that appears to be mediated by enhanced patient understanding of their disease (Brown, 2004).

Another study was conducted in Michigan on 3897 patients with diabetes treated in nine primary care clinics by 106 physicians in an integrated health plan showed that physician differences in practical support may influence glycemic control outcomes among patients with diabetes (Jochen & et al., 2009).

Moreover, a study was conducted to assess comprehensive characteristics of clinicians as well as the patient and to link those characteristics to glycemic control. This study did not find association between provider characteristics and glycemic level. This could have been the result of the organizational structure of the study site, the conclusion of the study illustrated that individual provider characteristics had limited ability to predict glycemic control or likelihood of treatment intensification. These data may suggest that systems of care may contribute more to glycemic control among patient populations compared with individual provider characteristics. Improving systems of care, such as disease-management services, may be a better use of resources than focusing on individual providers(LeBlanc, Rosales, & Kachro, 2015).

2.3.7 Social support and diabetes

Social support is exceptionally important for maintaining good physical and mental health. Overall, it appears that positive social support of high quality can enhance resilience to stress, help protect against developing trauma-related psychopathology, decrease the

functional consequences of trauma-induced disorders, such as posttraumatic stress disorder (PTSD), and reduce medical morbidity and mortality(Ozbaiy & Doughlas, 2007).

Evidence is strong for a relation between supportive social ties and better physical and mental health. Persons with diabetes with higher levels of social support have been associated with better self-management, including adherence to recommended diet and exercise regimens and better glycemic control (Brown, 2004).

A systematic review study showed that social support can predict the health promoting behavior, and is capable of predicting self-care behavior of patients with diabetes. Therefore, getting the family members, especially the spouse, involved in self-care behavior can be of significant importance in providing health care to patients with diabetes(Rad GS, 2013).

Chapter 3
Methodology

Introduction

This chapter will present the methodology that researcher used in this study and provides detailed description of the study design, the population who were targeted in this study, study sample and the sampling process.In addition, it will explore the study setting, eligibility criteria to define population who were involved in the study, the exclusion criteria to definethe population who were excluded from the study. Moreover, this chapter will define the instrument that the researcher used in this study, and how the validity and reliability of this instrument were checked. It will explain the process of data collection, data entry, statistical analysis, ethical and administrative considerations.

3.1 Study design

The study isquantitative, descriptive, analytical, cross-sectional study; the researcher utilized quantitative data collection and analysis method to determine the relationships between the social determinants and the control status of type 2 diabetic patients. Cross sectional study, design reflects the existing facts at the same time of data collection and consumes less time than other types of studies. The data were collected from type 2 diabetic patients who have follow up at UNRWA health centers in Gaza Strip.

3.2 Study population

Study population was type 2 diabetic patients who have their follow up atUNRWA health centers all over Gaza Strip. The total number of diabetic patients registered at UNRWA in Gaza Strip is 40,699 in 23 health centers all over Gaza Strip (UNRWA, 2016).

3.3 Study setting

The study was conducted among type 2 diabetic patients who have their follow up at UNRWA health centers and have Non-communicable Disease file.

3.4 Eligibility criteria

3.4.1 Inclusion criteria

Patients who have type 2 diabetes and have NCD file at UNRWA health centers. In addition, the participants should have HBA1c done in the last 3 to 4 months to be reliable, as HBA1c reflects the average blood sugar in the last 3 to 4 months.

3.4.2 Exclusion criteria

Patients who did not have type 2 diabetes or patients who have type 2 diabetes but did not do HBA1c in the last 3- 4 months.

3.4.3 Controlled patients

A controlled case of type 2 diabetes according to UNRWA technical guidelines is the case who have HBA1c equal or less than 7%.

3.4.4 Uncontrolled patients

Uncontrolled case of type 2 diabetes according to UNRWA technical guidelines is the case who have HBA1c more than 7%.

3.5 Sample and sampling process

3.5.1 Sample size

The number of type 2 diabetic patients registered at UNRWA clinics are 40,699; the researcher selected 400 participants (Annex4) as a representative sample. The Sample size was calculated based on 95% confidence and 5% level of precision (Wong, 2013). The sample was divided in to two equal parts 200 patients who have controlled blood sugar according to HBA1cequal or less than 7, and 200 have uncontrolled blood sugar according to HBA1c more than 7, to allow to compare the different variables of the study between controlled and controlled patients.

3.5.2 Sampling process

Proportional Stratified Sampling of the UNRWA health centers was used including the five governorates. Gaza Strip was divided into five strata (North Gaza, Gaza, Mid-zone, Khan-Younis and Rafah). The researcher selected ten health centers across Gaza Strip (five

main big health centers and five small health centers) randomly. In addition, the researcher-selected patients receiving their care in these health centersaccording to how much each governorate represent the population(Annex 6 and 7).

Half of the sample have HBA1c equal or less than seven; the other half have HBA1c more than seven to allow comparison of different variables between controlled and uncontrolled groups.

3.6 Study period

The study started after discussion of the study proposal and agreement of Al Quds University May 2017. The development of the study tool, validation, revision and the experts check end in August 2017, the approval for conducting the study was in September.

The pilot study was conducted in September 2017 after that data collection was started and completed in October 2017.

The actual data collection began in late October 2017 and continue for January 2018, after that data analysis was completed at the end of February. The study final report was completed by the end of March.

3.7 Study instruments

- An interviewed questionnaire was developed by the researcher to collectdata from the participants from the ten health centers.The questionnaire was designed to involve the fivedomains:

1. Socio-demographic variables: level of education, income, unemployment, housing, age and sex.
2. Health behavior: smoking, exercise, self-monitoring of blood sugar, obesity, taking medication at the proper time as prescribed and stress.
3. Health care provider characteristics: listening, counseling, clarification and giving the enough time.
4. Social support: which includes physical and emotional support
5. Glycemic control which is determined according to the level of HBA1c.

- For measuring the level of psychological distress General Health Questionnaire (GHQ) were used. GHQ is a screening device for identifying minor psychiatric

disorders in the general population and within community or non-psychiatric clinical settings such as primary care or general medical outpatients. Suitable for all ages from adolescent upwards – not children, it assesses the respondent's current state and asks if that differs from his or her usual state. It is therefore sensitive to short-term psychiatric and stress disorders (GL Education Group, 2017).

3.8Data collection

Data was collected by the researcher and other qualified staffwith medical background, their number was six, they are well trained and has experience in this issue using interviewed questionnaire with type 2 diabetic patients who visit the health center for their appointment. The collection of data started on October 2017, and ended in January2018, the collection of data was in NCD station at UNRWA centers to allow reviewing the file and taking the value of HBA1cand BMI for those patients after taking their permission. The researcher used the interviewed questionnaire for the collection of data after taking the approval from the participants. The researcher told the participants that their participation in the study is optional, and they have the right to refuse participation, also after their agreement, they have the right not to answer any of the questions.

3.9Scientific rigor

3.9.1 Validity of the study and the questionnaire:

Face validity:

The questionnaire structure was well organized to look professional and to elicit serious response. During the development of the questionnaire, the layout of the questionnaire was reviewed many times and it was modified after the pilot study until the final version was developed.

Content validity

The questionnaire was submitted to group of expert's persons to evaluate the content validity of the questionnaire.The experts were academics, managers, technical advisors, researchers,statistician and experts working in the field. The evaluation was to assess each domain, review all the items in each domain, to identify if the items of each domain is able to measure what is intended to measure. In addition, expertsassess if the questionnaire covers all the items that are supposed to be studied. The researcher considered all the

experts' feedback and modified the questionnaire according to it. In addition,the researcher revised the questionnaire after the pilot studyand did minor modification. Finally, the researcher trained the persons who helped in data collection well to ensure the standardization of data collection process.

3.9.2 Reliability

Reliability refers to the degree to which the results obtained by a measurement and procedure can be replicated. To ensure reliability, the researcher trained people who helped in data collection how to ask the questions and how to select the cases for the study.In addition,data entry was done at the same day of data collection in order to check the accuracy of data to avoid data loss, and the researcher reviewed the questionnaires before leaving the HC to assure that the data is complete. In addition, the researcher re-entered 5% of the data to check the accuracy of data entry.

Finally, the researcher used Cronbach's alpha to test reliability of the questionnaire which has scales (nutrition, health care provider and social support).Alpha coefficient for the health provider characteristics was 0.807 and for social support, it was 0.885. The results on internal consistency are in (Annex 8).

3.10 Pilot Study

A pilot study was conducted on 40 patients (10% sample) to test the appropriateness of the study instruments and to improve the validity and reliability of the study tool. After the pilot study, the researcher did minor modifications in the ordering of questions. The piloted cases were included in the study as no major modification was done.

3.11 Data analysis

Data was analyzed using SPSS software. Descriptive statistics was computed for the structure and process variables and the results were plotted in frequency tables. Cross tabulation for the variables and advanced statistical analysis were performed. Comparative analysis was conducted to compare the differences of study variables between type 2 diabetic patients with controlled and uncontrolled status.

Also independent sample t test was used to test the differences between continuous dependent variable with two independent categorical variables. In addition, One way ANOVA was used to test the differences between continuous dependent variables with 3 or more categorical variables and finally correlation tests were used to test the relationships between continuous variables.

3.12 Administrative and Ethical consideration

- An approval was obtained from the school of public health of Al Quds University and Helsinki Committee to conduct the study (Annex 2).
- An admin approval wasobtained from the chief director of health in UNRWA and from senior medical officer of each clinic in which the researcher study on it.
- Informed consent from participants was obtained by verbal consent, as it is more accepted than written consent. After verbal explanation of the purpose of the research and the content of the interview was performed, participant's consent was documented on the data collection sheet.
- All other ethical issues such as maintaining confidentiality and avoiding harm were strictly observed during the study.

3.13limitations of the study

Despite the strength of the methodology of this study, some potential limitation should be mentioned:

- The study was conducted only at UNRWA health centers so the role of health care provider characteristics in the control of diabetes could not be identified.
- Patients who did not do HBA1c in the last 4 months were excluded from the study.
- The data collection was at UNRWA health centers and this may lead to bias in health care provider assessment domain of the study.

Chapter 4

Results and Discussion

It is well known that diabetes mellitus is a chronic disease that requires long-term medical attention to limit the development of its devastating complications and to manage them when they do occur(American Diabetes Association, 2013). Although many therapies are available for managing diabetes and preventing or treating its complications, these therapies are underutilized and not always effective, as there are other factors affect the health of diabetic patients other than medical treatments. Those factors are the social determinants of health (Gonzalez-Zacarias, 2016).

In most communities and societies, some people have better access to health care and live in healthier environment than others. Therefore, they are generally healthier and live longer than others live with fewer advantages. The differences are caused by the social conditions such as income, education, discrimination, policies and geography rather than by genes or luck. When the living and the surrounding conditions are unequal, they will cause health inequity. When these conditions are equally distributed, we can develop a healthier community. In addition, improve the quality of life for all (Brennan, Baker, & Metlezer, 2008).

This chapter highlights the main findings of the study; describe the characteristics of study participants, and illustrate the differences of the social determinants between controlled and uncontrolled cases. Then inferential statistics are explored, to discuss the relationships between social determinants of health and the control of diabetes and level of HBA1c. Finally, discussion and explanation of such relationships are presented.

Descriptive statistics and inferential statistics:

The following part shows the results of the study distributed in tables and clarify the inferential statistics to assess the relationships of study variables and HBA1c and compare between the differences of study variables among controlled and uncontrolled cases of diabetes. The researcher conducted different statistical tests, such as Chi square, independent sample t test, One Way ANOVA and Pearson correlation.

Table (4.1): Distribution of study participants according to their sociodemographic data

Variable	Controlled		Uncontrolled		Total		X^2	Sig
	Freq.	%	Freq.	%	Freq.	%		
Age group								
Less than 50 years	47	23.5	59	29.5	106	26.4	31.053	0.001
From 51 to 59 years	50	25.0	85	42.5	135	33.8		
From 60 to 69 years	43	21.5	36	18.0	79	19.8		
70 Years and more	60	30.0	20	10.0	80	20.0		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Mean age for controlled is 58.5, The mean for uncontrolled is 54.7								
Gender								
Male	68	34.0	65	32.2	133	33.1	0.152	0.388
Female	132	66.0	135	67.8	267	66.9		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Mean HBA1c for females is 8.23, the mean for males is 8.18								
Marital Status								
Not Married	49	24.5	39	19.5	88	22.0	1.457	0.139
Married	151	75.5	161	80.5	312	78.0		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Address								
North	40	20.0	42	21.0	82	20.5		
Gaza	50	25.0	56	28.0	106	26.5		
Middle Zone	50	25.0	33	16.5	83	20.8		
Khanyounis	30	15.0	40	20.0	70	17.4		
Rafah	30	15.0	29	14.5	59	14.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Education								
Primary	53	26.5	50	25.0	103	25.8	4.968	0.174
Preparatory	40	20.0	50	25.0	90	22.4		
Secondary	58	29.0	67	33.5	125	31.3		
Diploma and Above	49	24.5	33	16.5	82	20.5		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		

4.1 Distribution of study participants according to their socio-demographic characteristics

The sociodemographic characteristics that have been studied are the age, gender, marital status, income, work and living and housing conditions:

4.1.1 Age

As shown in (table 4.1): The overall mean age of the participants was 56.6 years old with a minimum of 21 and the maximum of 80 years old, and this was expected as the risk of having type 2 diabetes isknown to increase with age. The mean age for participants having controlled blood sugar was 58.5, however the mean age for participants having uncontrolled blood sugar was 54.7 (Annex 9).

The distribution of participants who have controlled blood sugar according to age groups was: 23.5% are less than 50 years old, 25% cases are from 51-59 years old, 21.5% are from 60-69 years old, and 30% are 70 or more years old. However, for uncontrolled cases :29.5% are less than 50 years old, 42.5% are from 51 to 59 years old, 18% are from 60 to 69 years old and 10% are more than 70 years old.

As sown in (table 4.1): Chi square test was conducted to study the differences between age groups and the control status of diabetes and it showed a significant difference between age and control status of diabetes as evidenced by ($x^2$31.053 and p value of 0.001). This is consistent with the results of a cross sectional study conducted in adults known to have diabetes to identify if HBA1c could be affected by the age differences (Doubeuez & Xue, 2014).A correlation test was used to test the direction of the relationship between age and HBA1c.

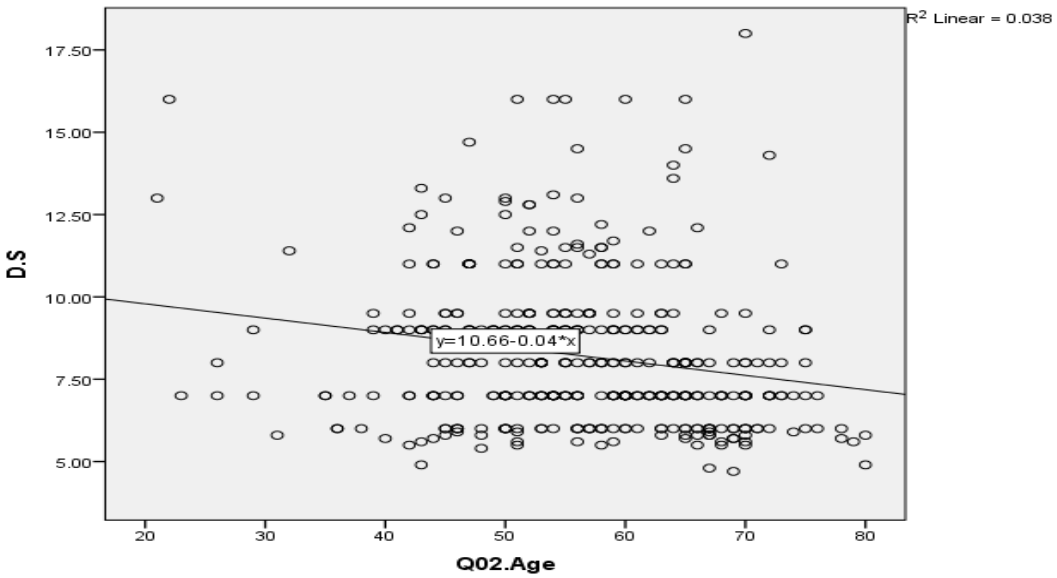

Figure 4.1: Correlation between age and HBA1c

As shown in (figure 4.1): There is also a significant correlation between age and the level of HBA1c with (r 0.196 and p value of 0.001), and it is a negative relationship, meaning that the level of HBA1c decrease with age; this could be explained by thatwith increasing age, patients become more aware and more caring about their health. Also could be explained by that the type of food that older patients take. As elderly patients prefer healthy food, vegetables and fruits rather than fast food which has a bad effect on the blood sugar.

4.1.2 Gender

The second socio-demographic variable that was studied is gender, as shown in (table 4.1): 66.9% of the study participants were females while 33.1 % were males. This could be explained by that, the utilization of the UNRWA Health Centres is known to be higher by females than by males (Table 4.1).

As shown in (table 4.1): the researcher studied the difference between gender and the control status of diabetes, and there was no significant differences as evidenced by (x^2 0.152 and p 0.388). The result of this study is consistent with the results of another study conducted by Anderson that found that women were found to have a greater interest and concern for diabetes and were more likely to perceive symptoms (Anderson & Oh, 1993). Women make greater use of diabetes services and have a larger network of people with whom to discuss medical problems. Women also report more illnesses than men do, however, women appear to be more knowledgeable about and sensitive to the symptoms of diabetes, and seek care more frequently than men (Anderson & Oh, 1993). This was clearly

observed in this study as the patients were selected randomly and the highest percentage (about 70%) of the study sample were females. Despite all of these differences there was no significant difference in the control status between male and females and this is consistent with this study.

4.1.3 Marital Status

Concerning the marital status, (table 4.1) showed that the overall marital status of the participants was: 22% were not married and 78% were married.

As shown in table (4.1): The researcher studies the difference between the marital status and the control of diabetes, a chi square test was conducted, and there was no significant differences as evidenced by (x^2 1.457 and p 0.139). This could be explained by the results of another study from the literature, which showed that the quality of the relationship with the intimate partner has the effect on the control of diabetes rather than the marital status itself. The stress of the bad marital status could have negative effect on the immune system, heart and the blood glucose (Diabetes Self Management, 2015).

4.1.4 Address

Regarding address: the sampling was according to the distribution of the number of cases among Gaza Governorates. 20.5% were from the North, 26.5% were from Gaza, 20.8% from Middle Zone, 17.4% from Khanyounis and 14.8% from Rafah.

4.1.5 Education level

One of the socio-demographic variable that have been studied was the education level, as shown in (table 4.1), the study showed that about 25.8 % of the participants had primary education, 22.4% had preparatory education, 31.3% had secondary education and 20.5% had diploma and above education. Among controlled cases: 26.5% had primary education. 20% had preparatory, 29% had secondary education and 24.5% had diploma and above education. For uncontrolled cases: 25 % had primary education, about 25% had the preparatory level, 33.5% had the secondary education, and 16.5% had diploma and above. High education is relatively low (20.5%) among the participants and this could be explained by the high average age of the participants, which is 56 years and as known elderly people are less educated than young people.

As shown in table (4.1): The researcher studied the difference between the education level between controlled and uncontrolled, a chi square was used to test these differences and it was not significant with ($x^2$4.968 and p 0.174). The current study showed that the educational level had no impact on glycemic control, which is consistent with Al Rashedi study, which was conducted to evaluate the impact of the educational level on glycemic control among patients with type 2 diabetes mellitus. The study showed that the education level have no impact on glycemic control, but the patients of high education level had better awareness of the complications and a high rate of adherence to diet. About 70.5% of patients were aware of two or more diabetic complication (Ali & Al Rasheedi, 2014).

Table (4.2): Distribution of study participants according to work and income:

Variable	**Controlled**		**Uncontrolled**		**Total**		**Factor**	**Sig**
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**		
Work or not							X^2	**P**
Yes	38	19.0	38	19.0	76	19.0	0.000	0.551
No	162	81.0	162	81.0	324	81.0		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Have ever worked								
Yes	40	24.7	40	24.7	80	24.7		
No	122	75.3	122	75.3	244	75.3		
Total	**162**	**100.0**	**162**	**100.0**	**324**	**100.0**		
Age when left job							**R**	**P**
40 years and Less	5	14.7	14	35.9	19	25.3	-0.346	0.003
From 41 to 50 Years	8	23.5	13	33.3	21	28.4		
More than 50 Years	21	61.8	12	30.8	33	46.3		
Total	**34**	**100.0**	**39**	**100.0**	**73**	**100.0**		
Cause of not working now								
No chance	26	31.3	20	25.6	46	28.6		
Don't like	4	4.8	6	7.6	10	6.2		
No Need	3	3.6	4	5.1	7	4.35		
Healthy cause	15	18.1	26	33.5	41	25.8		
Other	35	42.2	22	28.2	57	35.6		
Total	**83**	**100.0**	**78**	**100.0**	**161**	**100.0**		
Monthly Income							**R**	**P**
1000 NIS and Less	96	61.9	110	65.5	206	63.8	0.047	0.404
More than 1000 NIS	59	38.1	58	34.5	117	36.2		
Total	**155**	**100.0**	**168**	**100.0**	**323**	**100.0**		
Source of your income							**F**	**P**
Current Work	44	23	43	22.5	87	22.7	2.237	0.020
Retirement Salary	41	21	25	13.1	66	17		
Social Affairs	56	29.0	66	34.6	122	31.8		
NGO's and relative Support	36	18	26	13.6	60	15.8		
Other	18	9	31	16.2	49	12.6		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Sufficient income or not							**t**	**P**
Yes	61	30.5	46	23.0	107	26.7	-1.999	0.047
No	139	69.5	154	77.0	293	73.3		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Mean HBA1c for sufficient income is 7.83, mean for insufficient income is 8.33								

4.2 Distribution of study participants according to work and income:

Another socio-demographic variable that have been studied was the work status. As shown in (table 4.2), about 19% of participants were working, however 81% were not working, this is expected in our society as we face large problem in unemployment which one of the highest level all over the world.The mean of HBA1c among the participants who work is 8.5; however, among who don't work the mean was 8.25 (Annex 9). The percentage of participants who had ever worked is 24.7% while the percentage who had never worked is 75.3.

One of the questions that have been asked was: when did you left your job. As shown in (table 4.2): About 25.3 % of participants answered that they left the job at 40 years and less, 28.4% left the job at the age from 41 to 50 while 46.3 % answered that left the job at the age more than 50. Among controlled cases about 14 % left the job at the age less than 40, 23.5% left the job at the age 41 to 50 years, and 62% left the job at the age more than 50 years.

However, among uncontrolled 35.9 % left the job at the age less than 40 years, 33.3% left the job at the age from 41 to 50, and 30.8% left the job at the age more than 50 years. The researcher asked another question related to the work, why you are not working now.

As shown in (table 4.2): A chi square test was used to examine the differences of work status among controlled and controlled diabetic patients and it showed that: the work status has no effect on the control status of diabetes as evidenced by (X^2 0.000 and p 0.551). This result is consistant with another study conducted to evaluate quantitatively whether the work environments of adults with diabetes relate to the adequacy of glycemic control. The study concluded that, for insulin-treated adults with diabetes, work system variables do not directly relate to glycemic control, but they do relate to psychosocial adaptation (Traif, 2003).

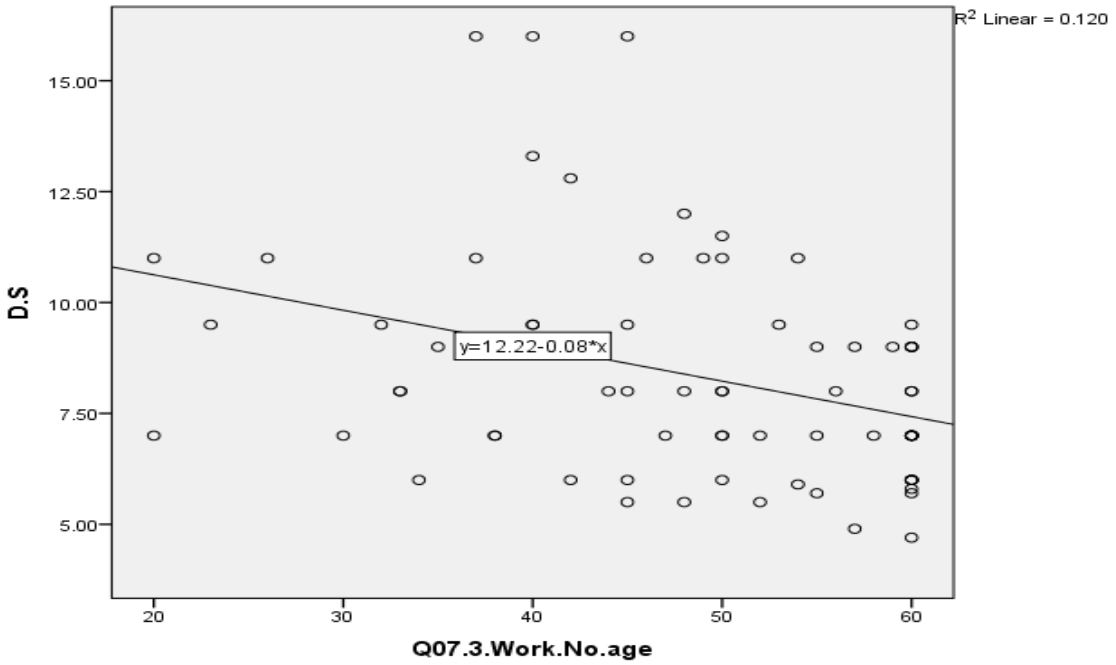

Figure 4.2: Correlation between age at leaving Work and HBA1c:

On the other hand, the age when the patients left the job has a signifiant differences with the control status. A correlation test was used to study the direction of the relationship between the age when the patients left the job and the level of HBA1c. As shown in figure (4.2): its negative correlation with (r -0.346 and p 0.003), meaning that the older the age when the patients left the job, the lower the level of HBA1c, this could be explained by that the pateints who have lower level of HBA1c are more healthy and productive and can work for older ages than those who have higher HBA1c (Xiamong & Jihao, 2016).

4.2.1 Income

The researcher asked an important questions related to income of the study participants, the first one was the amount of income and the second question asked if it sufficient or not and also the source of income. About 64% of patients had income1000 NIS (New Israeli Shekels) or less, however 36.% have income of more than 1000 NIS. The mean income for the study participants was 1242 NIS (Annex 9) and this lower than the income in reports from UN that showed that the average income in Gaza Strip is 1,680 NIS, and about 63.1% of Gaza residents live below the UN poverty line.

Among controlled cases, 61.9% had income of 100NIS or less, and 38.1% had income of more than 1000 NIS. Among uncontrolled cases, 65.5 % have income of 1000 NIS or less and 34.5% have income more than 1000 NIS.

4.2.2 Source of income

As shown in (table 4.2): about 23% of participants got income from their current work and this is low percentage, 17.2% from retirement pension, 31.8% from social affairs, 15.8% from NGOs support, and 12.6% from others. Among controlled cases: 22.8% got their income from current work, 21.2% from retirement salary, 29% from social affairs, 17.7% from NGOS and relative support, and 9.3% from others. However among uncontrolled cases: about 22.5 % got income from current work, 13.1% from retirement salary, 34.6% from social affairs, 13.6% from NGOs or relative support, and 16.2% from others.

4.2.3 Sufficient income or not

For the income being sufficient or not, as shown in (table 4.2): about 27% of participants told that they had sufficient income while 73.2 % told that they their income is insufficient. Among controlled cases: 30.5% had sufficient income and 69.5 % had insufficient income, mong uncontrolled cases: 23% had sufficient income however, 77% had insufficient income. This is consistent with the reports of PCBS, which show that about 60% of Palestinian live in Gaza are under the poverty (PCBS, 2016).

Mean HBA1c for who had sufficient income was 7.83; however, the mean of HBA1c among who had insufficient income was 8.33 (Annex 9).

As shown in (table 4.2) : There is no significant differences between HBA1c and the amount of income as evidenced by (r 0.047, p 404). However for the income being sufficient or not a t test was conducted and it showed significant relationship as evidenced by (t -1.999 and p 0.047). This is consistant with a study conducted in China which showed that the lower the socioeconomic level is associated with poor metabolic conrol and more diabetes complication.

The results of this study is also consistent with a study conducted by Health Services Research to study education, income and immigration as risk factors for high HbA1c, when diagnosed with type two diabetes or latent autoimmune diabetes in adult. The conclusion of the study was; patients with low income are more likely to have HbA1c more than 8.6% when diagnosed with type 2 diabetes (Matts , Ronnie, & Lief, 2017).

Poverty is associated with a higher incidence of diabetes probably because high income enables individuals to purchase various goods and services to improve health care. In

addition, higher income have better access to healthy diet and medical care, which can improve their control status.

As shown in (table 4.2): One Way ANOVA test was done to identify the relationship between the source of income and the level of HBA1c, and it showed a significant relationship status as evidenced by (F2.273 and p 0.02). Post hock test showed that participants who have retirement salary r have better control status compared to others, this may be due to the feeling of income security (Annex 10).

Table (4.3A): Distribution of study participants according to housing and living conditions

Variable	**Controlled**		**Uncontrolled**		**Total**		**Factor**	**Sig**
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**		
Dwelling							X^2	P
Owned	181	90.5	183	91.5	364	91.0	1.211	0.546
Rent	9	4.5	11	5.5	20	5.0		
Other	10	5.0	6	3.0	16	4.0		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
kind of dwelling participant live in							X^2	P
Separated home	74	37.0	71	35.5	145	36.3	3.777	0.151
Flat	112	56.0	123	61.5	235	58.7		
Others (Room, Tent)	14	7.0	6	3.0	20	5.0		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Crowding index							R	P
One	53	26.9	33	16.7	86	21.8	0.124	0.014
Two	68	34.5	92	46.5	160	40.5		
Three	52	26.4	50	25.3	102	25.8		
Four	24	12.2	23	11.6	47	11.9		
Total	**197**	**100.0**	**198**	**100.0**	**395**	**100.0**		
Rating of living condition							**F**	**P**
Good	57	28.8	48	24.4	105	26.6	4.522	0.011
Acceptable	79	39.9	78	39.6	157	39.7		
Bad	62	31.3	71	36.1	133	33.7		
Total	**198**	**100.0**	**197**	**100.0**	**395**	**100.0**		
What make participants annoyed in your house							X^2	P
Not enough space	39	196	50	25.3	89	22.4	1.825	0.109
Loneliness	26	13.1	19	9.6	45	11.3	1.189	0.176
Not caring	22	11.1	21	10.6	43	10.8	0.021	0.507
No privacy	8	4.0	13	6.6	21	5.3	1.284	0.182
Noise because of children	39	19.6	41	20.7	80	20.2	0.076	0.440
Lack of electricity	164	82.4	160	80.8	324	81.6	0.170	0.389
Others	21	11.1	17	8.7	38	9.9	0.616	0.270
Having other source of electricity							X^2	P
Yes	163	81.5	151	75.5	314	78.5	2.133	0.090
No	37	18.5	49	24.5	86	21.5		
Total	200	100.0	200	100.0	400	100.0		

4.3 Distribution of study participants according to housing and living conditions

One of the important variables that have been studied were the housing and the living conditions

4.3.1 Housing

As shown in (table 4.3): 91% of participants live in owned houses, 5% live in rented houses and 4% live in other.

4.3.2 Crowding index

Crowding index is the number of people living at home over the number of bedrooms.
As shown in (table 4.3): 21.8% of participants has crowding index of one, 40.5% has crowding index of two, 25.8% of participants has crowding index of three, and 11.9% of participants has crowding index of four.
The mean of HBA1c for participants have one crowded index is 7.58, for two-crowded index is 8.36, for three-crowded index is 8.51, and for four-crowded index is 8.2 (Annex 9).
As shown in (table 4.3): Crowding index (number of people living at home over the number of rooms) and living conditions were studied in relation to the control of diabetes (Annex 9). A correlation test was used to examine the relationship between the crowding index and the control of diabetes and it showed a significant difference as evidenced by (r 0.124 and p 0.014).

4.3.3 Overall living conditions

One of the social determinants of health that was studied was the living conditions participants are living. As shown (table 4.3): About 26% of participants had good living conditions according to their answers, 39.7% had acceptable living conditions while 33.7% had bad living conditions. Among controlled cases, 28.8% have good living conditions, 39.9% have acceptable living conditions and 31.3% have bad living conditions. However, among controlled cases, 24.4% have good living conditions, 39.6% have acceptable living conditions and 36.3% have bad living conditions.
As known electricity shortage is one of the major problems that Gaza people suffer, and this puts individuals under severe stress, one of the questions that the researcher asked if

they have alternative source of electricity. As shown in (table 4.3): 78.5% of participants had alternative source for electricity, and 21.5 did not have alternative source for electricity.

Among controlled cases, 81.5% had alternative source for electricity and 18.5% did not have alternative source of electricity. However, among uncontrolled cases, 75.5% have alternative source of electricity and 24.5% do not have alternative source of electricity.

As shown in (table 4.3) One Way ANOVA was used to test the differences between living conditions and the level of HBA1c. Post hock test showed significant differences between the means for good and bad living conditions with (F 4. 55, p 0.011). Annex 10.

As shown in (table 4.3): The study showed a significant differences between participants having good or moderate general conditions with mean 7.81 and 8.05 and those who have bad general conditions with mean 8.65 , meaning that HBA1c level is higher in patients with bad living conditions.

The findings of this study related to income, crowding index, housing conditions and the control of diabetes are consistent with other studies from the literature. Researchers from New York University and the National Population health Survey (NPHS) conducted a study on low and high-income categories and the prevalence of type 2 diabetes.

The studies showed that the risk of developing diabetes is more than double among men with low income, and more than triple among women with low income. Results from the NPHS analysis were striking; Researchers found that living in poverty in the two years prior to diagnosis increased the risk of developing Type 2 diabetes by 24 percent, a risk not changed when factoring in weight or physical activity. Living in poverty at any time increased the risk by 26 percent (Diabetes In Control, 2010).

In addition, this was explained by that, the living conditions put low-income adults and children at risk for myriad diseases, not just diabetes. First, there is the chronic stress of low-income living that can adversely affect health. The strain of being short on money and living in inadequate housing, or not having any housing at all, can spike levels of cortisol, a hormone released when the body is under stress. While cortisol helps the body deal with stress, constantly elevated levels can cause a wide range of negative side effects, such as high blood sugar levels or high blood pressure (Diabetes In Control, 2010).

Low-income individuals often find it difficult to access fresh, healthy foods and programs that promote physical activity, both of which are key to managing stress, controlling weight and, therefore, preventing disease.

4.4 Distribution of study participants according to their health status and behaviour

The researcher asked the participants if they have another comorbid condition such as HTN, heart disease, thyroid dysfunction or any other illness.

Table (4.4A): Distribution of the study participants according to health Status

Variable	Controlled		Uncontrolled		Total		Factor	Sig.
	Freq	%	Freq	%	Freq	%		
Having any other chronic disease							X^2	P
Yes	143	71.5	133	66.5	276	69.0	1.169	0.165
No	57	28.5	67	33.5	124	31.0		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Type of Disease							X^2	P
Hypertension	120	83.9	101	75.9	221	80.1	2.744	0.049
Renal disease	5	3.5	2	1.5	7	2.5	1.107	0.254
Respiratory disease	6	4.2	2	1.5	8	2.9	1.774	0.166
Heart disease	20	14.0	28	21.2	48	17.4	2.395	0.042
Rheumatologically	17	11.9	17	12.8	34	12.3	0.051	0.482
Thyroid	5	3.5	4	3.0	9	3.3	0.052	0.545
Other	7	4.9	12	19.0	19	6.9	1.831	0.132
Having family member with diabetes							X^2	P
Yes	108	54.0	118	59.0	226	56.5	1.017	0.182
No	92	46.0	82	41.0	174	43.5		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
If yes, what is the relationship							X^2	P
Father	52	47.7	47	39.8	99	43.6	1.429	0.144
Mother	52	47.7	68	57.6	120	52.9	2.238	0.048
Sister or brother	39	35.8	40	33.9	79	34.8	0.088	0.437
Son or daughter	6	5.5	11	9.3	17	7.5	1.192	0.201
Others, specify	8	7.3	4	3.4	12	5.3	1.765	0.151
Years of having diabetes							R	P
Less than 5 Years	78	41.5	44	22.3	122	31.7	0.174	0.001
From 5 to 9 years	43	22.9	56	28.4	99	25.7		
From 10 to 14 Years	42	22.3	55	27.9	97	25.2		
15 Years and above	25	13.3	42	21.3	67	17.4		
Total	**188**	**100.0**	**197**	**100.0**	**385**	**100.0**		
Adherence to appointment in the clinic							X^2	P
Always	170	85.0	174	87.0	344	86.0	0.343	0.842
Sometimes	29	14.5	25	12.5	54	13.5		
Never	1	0.5	1	0.5	2	0.5		
Total	**200**	**100.0**	**200**	**100.0**	**200**	**100.0**		

Table (4.4 B):Distribution of the study participants according to health Status

Variable	Controlled		Uncontrolled		Total		Factor	Sig.
	Freq	%	Freq	%	Freq	%		
Self-monitoring of blood sugar at home							X^2	P
Always	42	21.0	50	25.0	92	23.0	20.020	0.364
Sometimes	34	17.0	40	20.0	74	18.5		
Never	124	62.0	110	55.0	234	58.5		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
How participants come to the clinic								
Walk	59	29.5	63	31.5	122	30.5	0.509	0.775
Car	105	52.5	105	53.0	211	52.8		
Both	36	18.0	31	15.5	67	16.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
If walking, how much time does it take							X^2	P
10 Minutes and less	25	24.0	36	31.6	61	28.0	1.691	0.429
From 11 to 20 min.	43	41.3	40	35.1	83	38.1		
More than 20 Min.	36	34.6	38	33.3	74	33.9		
Total	**104**	**100.0**	**114**	**100.0**	**218**	**100.0**		
If using transportation, how much does it cost							X^2	P
2 NIS. and less	77	51.0	84	55.3	161	53.1	0.802	0.670
From 3 to 4 NIS.	55	36.4	48	31.6	103	34.0		
5 NIS. and above	19	12.6	20	13.2	39	12.9		
Total	**151**	**100.0**	**152**	**100.0**	**303**	**100.0**		

As shown in (table 4.4A): 69% of participants complain of other comorbid condition, and 31 % do not have other comorbid condition. Among controlled cases, 71.5 % complain from other illness and 28.5% do not have other illness. However, among uncontrolled cases, 66.5% complain from other illness and 33.5% do not complain.

4.4.1Participants having other disease

Eighty percent have hypertension, 2.5% have renal disease, 2.9% have respiratory disease, 17.4% have heart disease, and 12.3% have rheumatological disease. 3.3% have thyroid and finally 6.9% have others. It seems that there an association between diabetes and hypertension; about 80% of diabetic patients have hypertension and this consistent with the literature, which shows that the association between diabetes and hypertension may be due to the same metabolic pathway that lead to both of them (Bermard & Chao, 2012). Another study conducted by Lana, showed that 70% of patient who have diabetes has HTN also (Lana, 2017).

As shown in (table 4.4A), Chi square test was used to test the differences between HTN and the control status of diabetes and it showed a significant relationship with (^{2} 2.47and p

0.049). This could be explained by that having comorbid conditions such as HTN making controlling the blood sugar more difficult and it may be also due to the unhealthy life style that make the patients developing diabetes and hypertension and affects the control status.

In addition, this is applicable for patients who have heart disease, chi square test was used and it showed significant relationship with (X^2 2.395 and p 0.042).

4.4.2 Years of having diabetes

As shown in (table 4.4 A) the researcher asked the participants about the number of years they are complaining of diabetes, 31.7% of participants had diabetes for less than 5 years, 25.5% had diabetes for 5 to 9 years while about 25% had diabetes from 10 to 14 years, and 17.4% had diabetes for 15 years or above.

As shown in (table 4.4 A): A correlation test was used to study the relationship between the number of years of having diabetes and the level of HBA1c, there is significant correlation evidenced by (r 0.174 and p 0.001).

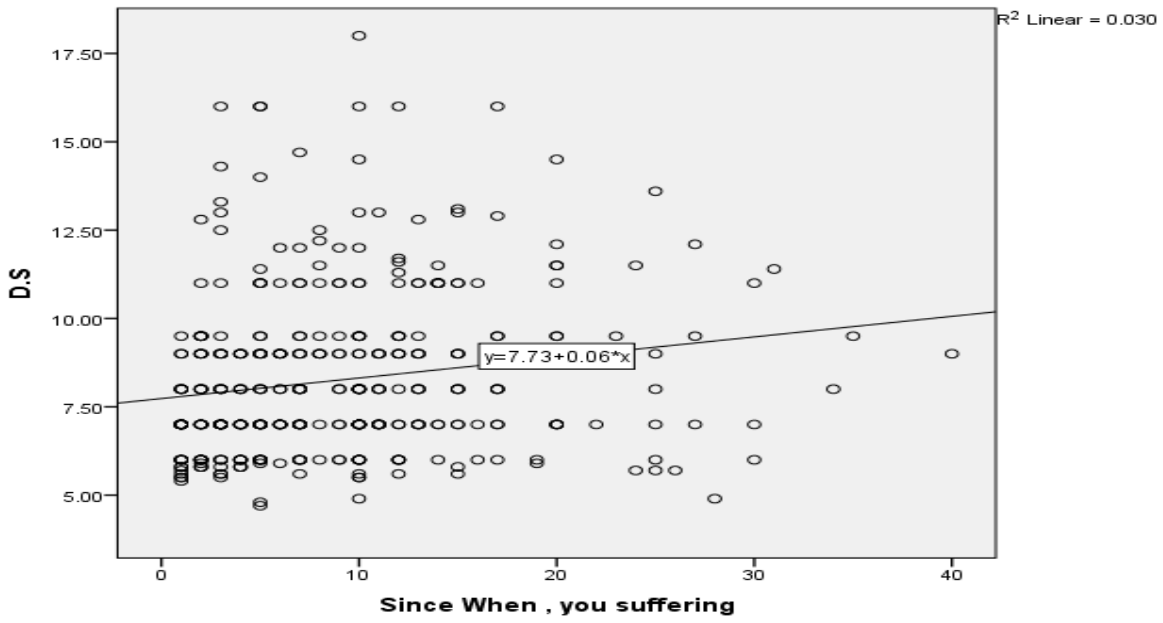

Figure (4.3): Correlation between years of having diabetes and HBA1c

As shown in figure (4.3): the correlation between years of having diabetes and HBA1c is a positive correlation, meaning that increasing the years of having diabetes, increase the level of HBA1c. This could be explained by that increasing the years of having diabetes,

exposing patients to higher risk of developing complication, which make the management and the proper control of blood sugar more difficult.

4.4.3 Adherence to appointment in clinic

The participants were asked if they adhere to their appointment to the clinic: as shown in (table 4.4 A), 86% of participants answered that they always adhere to their appointment in the clinic, 13.5% sometimes, and 0.5% never adhere to their appointment.

4.4.4 Self -monitoring of blood sugar

Self- monitoring of blood sugar may be confined to patients who have glucometer at their homes. The researcher asked the participants if they do self-monitoring of their blood sugar at home: as shown in (table 4.4 B) about 41.5 % of participants answered that do self-monitoring of blood sugar at home, while 58.5% answered that do not monitor their blood sugar at home.

As shown in (table 4.4 B): A chi square test showed no significant difference between self-monitoring of blood sugar and the control status of diabetes as evidenced by (X^2 20.020 p 0.364). This is consistent with recent systematic review study from Canada, which suggested that patients with type 2 diabetes who are not taking insulin do not require self-monitoring of blood glucose. Type 2 diabetes is increasingly common, so there may be significant costs associated with widespread use of blood glucose testing by these patients (Welle, 2010).

And this is also cosistant with another study conducted in 2012; systematic review study showed that in some individuals self-monitoring of blood sugar is associated with negative psychological outcomes including depression (Diabetes UK, 2017). This could be because self-monitoring of blood glucose put the patients under stress and they do not know how to interpret the results of their blood sugar.

Table (4.5): Distribution of study participants according to health behaviour: medication

Variable	Controlled		Uncontrolled		Total		Factor	Sig
	Freq.	%	Freq.	%	Freq.	%		
Taking medication as prescribed							**X^2**	**P**
Always	190	95.0	185	92.5	375	93.8	0.343	0.842
Sometimes	9	4.5	15	7.5	24	6.0		
Never	1	0.5	0	0.0	1	0.2		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Taking medication at the proper time							**X^2**	**P**
Always	176	88.0	168	84.0	344	86.0	1.347	0.510
Sometimes	22	11.0	29	14.5	51	12.8		
Never	2	1.0	3	1.5	5	1.2		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Type of medication the participants take for diabetes							**F**	**P**
Oral	163	81.9	121	60.5	285	71.2	12.149	0.000
Insulin	19	9.5	31	15.5	50	12.5		
Both	17	8.5	48	24.0	65	16.3		
Total	**199**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Mean of HBA1c for who are taking oral medication is 7.85, for insulin 8.86, both 9.2								

4.5 Distribution of study participants according to health behaviour: medication

4.5.1 Medication

As shown in (table 4.5):93.8 % always take medication as prescribed, 6% sometimes and 0.2% never take medication as prescribed.In addition, about 86 % of participants said that they always take medication at the proper time, 12.8% sometimes, and 1.3% said that they never take medication at the proper time. I think that over-estimated values as most diabetic patients have the fear to be blamed and most of the time they do not tell the truth regarding their compliance to medication.The researcher asked the participants about the type of medication they have for diabetes, is it oral medication, insulin injection or both.

As sown in (table 4.5): about 71.2% of participants answered that are taking oral medication, 12.5% are taking insulin and 16.3% are taking both oral medication and insulin and this is consistent with UNRWA annual report 2016 that about 28.2% of diabetic patients take insulin.Among controlled cases: about 82 % are taking oral medication, 9.5% are taking insulin and 8.5% are taking both, however among uncontrolled cases: 60.5% are taking oral medication, 15.5% are taking insulin and 24%

are taking both.Mean of HBA1c for who are taking oral medication is 7.85, for insulin 8.86, both 9.2 (Annex 9).

As shown in (table 4.5): One Way ANOVA Test was used to test the relationship between HBA1c and the type of medication and it showed a significant relationship. Post hock test (Annex 10) showed significant differences of the mean HBA1c in all treatment types as evidenced by (F 12.149, p 0.00).The significant relationship showed that insulin treated patients have higher HBA1c than those patients who are taking oral medications. This may be because there is no proper modification or adjustment to the dose of insulin according to the level of their blood sugar and the uncontrolled cases are the ones who are treated with insulin, as it is the last option in treatment.

Table (4.6): Distribution of study participants according to smoking and BMI:

Variable	Controlled		Uncontrolled		Total		X^2	Sig
	Freq.	%	Freq.	%	Freq.	%		
Body Mass Index								
Normal	15	7.5	28	14.0	43	10.8	5.05	0.080
Overweight or obese	185	92.5	172	86.0	357	89.2		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Smoking								
Yes mostly cigarettes	19	9.5	26	13.0	45	11.3	5.242	0.263
Yes mostly nargela	3	1.5	1	0.5	4	1.0		
Yes-cigarettes and nargela	2	1.0	0	0.0	2	0.5		
Smoke in the past but quit smoking	19	9.5	13	6.5	32	8.0		
Doesn't smoke now and in the past	157	78.0	160	80.0	317	79.3		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Number of cigarettes per day								
Less than 5	6	25.0	11	37.9	17	32.1	1.129	0.569
From 5 to 10	6	25.0	7	24.1	13	24.5		
More than 10	12	50.0	11	37.9	23	43.4		
Total	**24**	**100.0**	**29**	**100.0**	**53**	**100.0**		
Having any member of family Smoking								
Yes	100	50.0	103	51.5	203	50.8	0.090	0.421
No	100	50.0	97	48.5	197	49.3		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		

4.6 Distribution of study participants according to smoking and BMI

As shown in (table 4.6): only 10.8% of study participants have normal body mass index, however 89.2 are either overweight or obese and this run with UNRWA report that 90% of NCD patients are overweight or obese.

As shown in (table 4.6): a chi square was conducted to test the differences of BMI between controlled and uncontrolled and this was significant with (X^2 5.056 and p value 0.080).

Smoking

Concerning smoking, as shown in (table 4.6): about 13 % of study participants are smokers, either cigarettes smoking or nergela smoking however, 8% were smokers in the past.

As shown in (table 4.6): A chi square test was used to test the differences between being smoker or non-smokers in the control status of diabetes. The study showed no significant difference as evidenced by ($X^2$5.242, p 0.263). This could be explained by that smoking increase the incidence of diabetes not the control status according to systematic review study conducted by Willi, which concludes that, active smoking is associated with an increased risk of type 2 diabetes, but future research should attempt to establish whether this association is causal and to clarify its mechanisms(Will & et al., 2007).

Table 4.7 Distribution of study participants according to Psychological distress using General Health Questionnaire:

Psychological distress	Controlled		Uncontrolled		Total		X^2	Sig.
	Freq.	%	Freq.	%	Freq.	%		
Felt you are playing useful part in things?	41	20.5	24	12.0	65	16.3	5.309	0.015
Felt you are capable of making decisions about things?	39	19.5	35	17.5	74	18.5	0.265	0.350
Felt constantly under strain?	94	47.0	107	53.5	201	50.3	1.690	0.115
Been able to enjoy your day-to-day activities?	52	26.0	69	34.5	121	30.3	3.424	0.041
Been able to face up your problems?	43	21.5	47	23.5	90	22.5	0.229	0.360
Been feeling unhappy and depressed?	93	46.5	114	57.0	207	51.8	4.415	0.023
Been losing confidence in yourself?	33	16.5	35	17.5	68	17.0	0.071	0.447
Been thinking of yourself as worthless person?	26	13.0	22	11.0	48	12.0	0.379	0.322
Been feeling reasonably happy, all thing considered?	58	29.0	69	34.5	127	31.8	1.396	0.141

4.7 Distribution of study participants according to the level of Psychological distress

The researcher used the General Health Questionnaire to assess the level of psychological distress among type 2 diabetic patients. This questionnaire is used at UNRWA recently after the integration of mental health for assessment of the level psychological distress among the patients to identify the mode of intervention for those cases. The questionnaire consists of 12 questions, and according to the total score of the questionnaire, we determine the level of distress that the patient is exposed to.

As shown in (table 4.7): 32.5% of the participants was able to concentrate of what they were doing. However, 66% of the participants lost much sleep over worry, 66% of the controlled cases and 66% among uncontrolled cases. Only 16.3% of the participants felt they are playing useful part in things, only 18.5% feel that they are capable of making decisions.

As shown in (table 4.7): 50.3% of the participants feel constantly under strain, on the other hand about 23% of the participants feel that they could not overcome their difficulties, 23% of the controlled and 22.5% of the uncontrolled. As shown in (table 4.7): only 30.3% of the participants have been able to enjoy daily activities, in addition 22.5% of the participants declared that they have been able to face up their problems. About 52% of the participants have been feeling unhappy and depressed, 46.5% of the controlled and 57% of the uncontrolled. In addition 17% of the participants been losing confidence in themselves. About 12% of the participants said that they have been thinking of themselves as worthless person, finally only 31.8% of the participants have been feeling reasonably happy and this is low percentage but this is expected regarding the difficult situations they live.

As shown in (table 4.7): Achi square test was used to test some items in psychological stress and the control status of diabetes. There was a significant difference between feeling that he is playing useful part in life, being able to enjoy daily activity, feeling unhappy or depressed and the control status of diabetes with p value (0.015, 0.041, 0.023) respectively**.**

Table (4.8) Correlation between psychological distress and other variables (HBA1c, income, age, and social support)

Variables		R	Significance
Psychological distress	HBA1c	0.101	0.044
Psychological distress	Income	-0.120	0.031
Psychological distress	Age	0.074	0.142
Psychological distress	Social support	-0.120	0.016

As shown in (table 4.8): A correlation test was also used to test the relationship between the level of psychological stress (using the GHQ) and the level of HBA1c. It showed a significant positive relationship as evidenced by (r 0.101 and p 0.044), as shown in figure 4.4: increasing the level of psychological stress increase the level of HBA1c or vice versa, increasing the level of HBA1c increase the level of stress among patients**.**

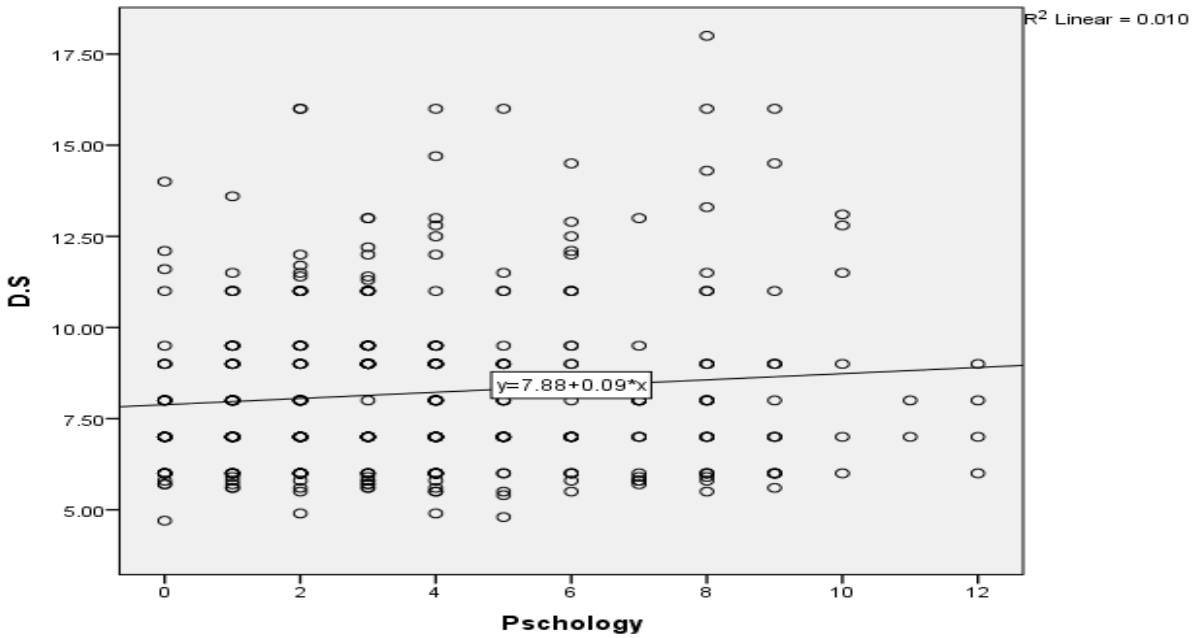

Figure 4.4: Correlation between the levelof psychological distress HBA1c

This is consistent with updates from American Diabetes Association, which tell that physical stress such as illness, or injury causes higher blood glucose levels in people with both type of diabetes (American Diabetes Association, 2013).

In addition, it also agree with Whichester study, which used a correlation analysis to test the relationship between diabetes distress and HbA1c. The conclusion of this study was

distress could significantly affect the control status among diabetic patients (Whichester, Whilliams, & Wolfman, 2016).

Another correlation analysis was used to test the relationship between income and psychological distress as shown in (table 4.8), the study showed significant negative relationship between the level of psychological distress and income, meaning that decreasing the income will increase the level of stress and this is not strange. Living in poverty creates an extreme amount of economic, emotional and physical stress. These, in turn, lead to a greater likelihood of worse health both physical and mental health.

In addition, correlation analysis was used to test the relationship between psychological distress and social support, as shown in (table 4.8) the test showed significant negative relationship as evidenced by (r -0.120 and p 0.016). One can imply that patient with less social support suffer from higher psychological distress.

Table (4.9): Relationship between the level of psychological distress with gender and education

Dependant variables	Independent variables	Factor	Mean	test	Significance
Level of Psychological distress	Gender	Male	3.0	t - 3.701	0.001
		Female	4.05		
Psychological distress	Education level	Literacy	5.08	F 4.927	0.001
		Primary	4.5		
		Preparatory	3.7		
		Secondary	3.5		
		Diploma	3.02		
		university	2.25		

As shown in (table 4.9), the researcher studied the differences between psychological distress level as a continuous variable with gender and education level.

Independent sample t test was used to compare the difference between males and females in the level of distress, the test showed a significant difference as evidenced by (t 3.701, p 0.001). Females are exposed to higher distress than males and this is expected in our culture and society. Females have more responsibilities than males, taking care of their homes, children and families in addition to work outside in some cases. They cannot have access to activities that may relieve or decrease their stress such as walking around or going to cafes or gym as male can do.

In addition One Way ANOVA was used to test the differences of psychological distress between different education levels, the test showed significant differences as evidenced by (F 4.92, p 0.001). Post hock test was done to identify the differences (Annex 10). It means that patients with lower level of education, have higher level of distress, this could be explained by low education level may expose people to higher risk of poverty and unemployment, which will increase the level of distress.

Table (4.10A): Distribution of study participants according to eating habits

Variables	Controlled		Uncontrolled		Total		X^2	Sig.
	Freq.	%	Freq.	%	Freq.	Freq.		
1. Do you skip breakfast more than once a week?								
Always	22	11.0	26	13.0	48	12.0	0.327	0.849
Sometimes	48	24.0	46	23.0	94	23.5		
Never	130	65.0	128	64.0	258	64.5		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
2. Do you skip Lunch more than once a week?								
Always	15	7.5	18	9.0	33	8.3	0.391	0.822
Sometimes	36	18.0	34	17.0	70	17.5		
Never	149	74.5	148	74.0	297	74.3		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
3. Do you skip dinner more than once a week								
Always	25	12.5	32	16.0	57	14.3	1.037	0.595
Sometimes	109	54.5	103	51.5	212	53.0		
Never	66	33.0	65	32.5	131	32.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
4. Do you skip meals and snack instead on most days								
Always	24	12.0	19	9.5	43	10.8	1.597	0.450
Sometimes	112	56.0	124	62.0	236	59.0		
Never	64	32.0	57	28.5	121	30.3		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
5. Do you eat more than 5 portions of fruit and/or vegetables every day?								
Always	28	14.0	32	16.0	60	15.0	0.332	0.847
Sometimes	95	47.5	94	47.0	189	47.3		
Never	77	38.5	74	37.0	151	37.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		

Table (4.10B): Distribution of study participants according to eating habits

Variables	Controlled		Uncontrolled		Total		X^2	Sig.
	Freq.	%	Freq.	%	Freq.	Freq.		
6. Do you eat more than 4 different varieties of fruit each week?								
Always	38	19.0	43	21.5	81	20.3	**0.398**	**0.820**
Sometimes	94	47.0	92	46.0	186	46.5		
Never	68	34.0	65	32.5	133	33.3		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
7. Do you choose low-fat products when available								
Always	108	54.0	109	54.5	217	54.3	**2.116**	**0.347**
Sometimes	70	35.0	77	38.5	147	36.8		
Never	22	11.0	14	7.0	36	9.0		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
8. Do you choose baked, steamed or grilled options when available, rather than fried foods								
Always	119	59.6	73	36.5	202	84.1	**83.89**	**0.001**
Sometimes	22	11.1	106	53.3	128	32.2		
Never	59	29.3	21	10.2	80	19.7		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
9. Do you opt for lean cuts of meat or remove visible fat – for example, removing the skin on chicken or the rind on bacon								
Always	91	45.5	120	60.4	211	82.9	**9.647**	**0.008**
Sometimes	73	36.4	48	23.9	121	30.1		
Never	36	18.2	32	15.7	68	17.0		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
10. Did you eat any oily fish every week?								
Always	52	26.0	45	22.5	97	24.3	**0.755**	**0.686**
Sometimes	96	48.0	98	49.0	194	48.5		
Never	52	26.0	57	28.5	109	27.3		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
11. Do you include some unsalted nuts and seeds in your diet								
Always	52	26.0	48	24.0	100	25.0	**1.517**	**0.468**
Sometimes	111	55.5	105	52.5	216	54.0		
Never	37	18.5	47	23.5	84	21.0		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
12. Do you regularly choose whole meal bread or rolls rather than white								
Always	54	27.0	48	24.0	102	25.4	**0.521**	**0.771**
Sometimes	71	35.5	72	36.0	143	35.8		
Never	75	37.5	80	40.0	155	38.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
13. Do you add sugar to your drinks?								
Always	72	36.0	71	35.5	143	35.8	**1.137**	**0.566**
Sometimes	69	34.5	61	30.5	130	32.4		
Never	59	29.5	68	34.0	127	31.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		

Table (4.10C): Distribution of study participants according to eating habits

Variables	Controlled		Uncontrolled		Total		X^2	Sig.
	Freq.	%	Freq.	%	Freq.	Freq.		
14. Do you regularly drink sweet fizzy drinks								
Always	4	2.0	22	11.0	26	6.5	**19.70**	**0.001**
Sometimes	99	49.5	113	56.5	212	53.0		
Never	97	48.**5**	65	32.5	162	40.5		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
15. Do you regularly eat cakes, sweets, chocolate or biscuits at work								
Always	17	8.5	21	10.5	38	9.5	**0.484**	**0.785**
Sometimes	130	65.0	126	63.0	256	64.0		
Never	53	26.5	53	26.5	106	26.5		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
16. Do you regularly add salt to food during cooking?								
Always	127	63.5	129	64.5	256	64.0	**1.030**	**0.598**
Sometimes	49	24.5	53	26.5	102	25.5		
Never	24	12.0	18	9.0	42	10.5		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
17. Do you regularly eat snacks between meals?								
Always	24	12.0	5	2.5	29	7.2	**21.46**	**0.001**
Sometimes	55	27.5	89	44.5	144	36.0		
Never	121	60.5	106	53.0	227	56.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		

4.8Distribution of study participants according to eating habits

As shown in (table 4.10): the researcher asked the participants 17 questions related to their nutrition habits including, skipping meals, eating fatty food, drinking sweetened drinks, adding salt to drinks, eating sweats and eating snacks between meals.

The study showed that 12% always skip breakfast, 8.3% always skip lunch, however 14.2% always skip dinner.

As shown in (table 4.10A),20% of participants eat four different varieties of fruit each week, and this expected as they live under hard economic conditions and high poverty rate. About 54% of participants prefer low fat diet when available which is a healthy nutritional choice but it is not available all the time. Only 24% of participants eat oily fish every week, this may be due to the high cost of such food.

One of the unhealthy habits for diabetic patients is drinking sweet fizzy drinks, about 6% of participants always drink sweet drinks, however 53% sometimes do this, this is very serious as such drinks contain large amount of sugar and could affect their health badly.

During regular soft drinks consumption, fat accumulates in the liver by the primary effect of fructose, which increases lipogenesis, and in the case of diet soft drinks, by the additional contribution of aspartame sweetener and caramel colorant, which are rich in advanced glycation products that potentially increase insulin resistance and inflammation (Nseir & Nassar, 2010).

Healthy nutrition is difficult as most of patients living in Gaza suffering from bad economic conditions and most of the time healthy nutritional choices are expensive.

As shown (table 4.10): A chi- square was used to test the differences in eating habits and the control of diabetes.There is significant differences between choosing baked steamed or grilled food when available and the control status of diabetes, with (x^2 83.89, and p value of 0.001)**.** Also, there is a significant difference between removing fat from meat and choosing lean cut of meat and the control of diabetes with (x^2 9.647, and p value of 0.008). In addition,a significant difference was observed between regularly drinking sweet or fizzy drinks and the control of diabetes with (x^2 19.7 and p value of 0.001). In addition, regularly eating snacks between meals showed a significant difference with the control status as evidenced by (x^2 21.46 and p value of 0.001) tha could be because patients usually depend on bread or starchy food as a snacks and this had bad effect on the control of diabetes

However, other eating habits such as skipping meals, eating five portions of fruit and adding salt to food seems to have no significant relationship with the control status.

Recently, evidence suggested a link between intake of soft drinks with obesity and with diabetes, because it has large amounts of high fructose corn syrup used in manufacturing of soft drinks, which raises blood glucose levels and BMI to the dangerous levels(Nassar & Nseir, 2010). It was also stated that soft drinks contain glycated chemicals that markedly augment insulin resistance.

Food intake has been strongly associated with obesity, not only with the volume of food but also in terms of the composition and quality of diet. High intake of red meat, sweets and fried foods, contribute to the increased the risk of insulin resistance and the risk of type 2 diabetes (B. Panajiotakos, Tazemia, & Pitsavos, 2005).

Table (4.11): Distribution of study participants according to physical Activity

	Controlled		Uncontrolled		Total		X^2	Sig.
	Freq.	%	Freq.	%	Freq.	%		
1. Do you get around on foot or by bicycle								
Always	58	29.0	64	32.0	122	30.5	0.450	0.799
Sometimes	99	49.5	96	48.0	195	48.8		
Never	43	21.5	40	20.0	83	20.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
2. Do you take the stairs instead of using elevator?								
Always	54	27.0	68	34.0	122	30.5	3.604	0.165
Sometimes	97	48.5	79	39.5	176	44.0		
Never	49	24.5	53	26.5	102	25.5		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
3. How many times per week, do you exercise at least 30 minutes? 1 or less hour per day								
Once	99	49.5	96	48.0	195	48.8	0.202	0.904
Twice	53	26.5	57	28.5	110	27.5		
Three times	48	24.0	47	23.5	95	23.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
4. Do you usually feel motivated to exercise								
Always	81	40.5	95	47.5	176	44	0.103	0.050
Sometimes	80	40	79	39.5	159	39.7		
Never	39	19.5	26	13.0	65	16.3		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
5. Are you too tired to exercise								
Always	72	36.0	70	35.0	142	35.5	1.528	0.466
Sometimes	100	50.0	93	46.5	193	48.3		
Never	28	14.0	37	18.5	65	16.3		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		

4.9 Distribution of study participants according to physical activity and sleep

As shown in (table 4.11): patients were asked questions related to physical activity, duration, timing, their motivation to exercise and if they are not practicing exercise what is the cause.

As shown in (table 4.11): only 23.8% of practice exercise 3 times per week, this is considered to be low percentage as life style modification (diet and exercise) is one of the important aspects in the management of diabetes.

The researcher asked the participants, if they do not exercise what is the cause, about 13% of them told that they are careless, 28% had no time to exercise, and 59.1% said that their

health situation.is the cause. These put patients in precious cycle as their health condition make them not to exercise and on the other hand, not exercising lead to more obesity and more deterioration in their health condition.

A shown in table (4.11) the researcher studied the differences between exercise among controlled and uncontrolled cases of diabetes. Feeling motivated to exercise had a significant relationship with the control status with (x^2 0.103, and p value of 0.05).

Although physical activity is a key element in the prevention and management of type 2 diabetes, many with this chronic disease do not become or remain regularly active. High-quality studies establishing the importance of exercise and fitness in diabetes were lacking until recently, but it is now well established that participation in regular physical activity improves blood glucose control and can prevent or delay type 2 diabetes, along with positively affecting lipids, blood pressure, cardiovascular events, mortality, and quality of life.

In this study, most of the patients are older than 50 years and they are either obese or overweight. This makes exercising difficult for them, they are motivated to exercise but they do not have the tools and the regular plan for exercise. The concept of exercising is still not well formed among people living in our society.

Table (4.12): Distribution of study participants according to sleep habits

Sleep habits	**Controlled**		**Controlled**		**Total**		**X^2**	**Sig.**
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**		
How many hours on average do you sleep each night								
5 hours and less	38	19.0	44	22.0	82	20.5	2.265	0.322
From 6 to 8 hours	136	68.0	122	61.0	258	64.5		
More than 8 hours	26	13.0	34	17.0	60	15.0		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Do you have difficulties with staying sleep?								
Always	43	21.5	37	18.5	80	20.0	0.585	0.746
Sometimes	96	48.0	101	50.5	197	49.2		
Never	61	30.5	62	31.0	123	30.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		
Do you weak up during the night								
Always	64	32.0	58	29.0	122	30.5	0.813	0.666
Sometimes	101	50.5	110	55.0	211	52.8		
Never	35	17.5	32	16.0	67	16.8		
Total	**200**	**100.0**	**200**	**100.0**	**400**	**100.0**		

4.10 Distribution of study participants according to sleep habits

Sleeping is one of the factors that could affect patient's life and health, so it was one of the factors that was included in the study, the researcher asked questions related to the sleep duration and factors that could affect their sleep.

As shown in (table 4.12): There is no significant differences in sleep among controlled and uncontrolled cases of diabetes namely number of sleep hours, difficulty in staying sleep. Sleeping hours seems to have no direct effect on the control status of diabetes or HBA1c but may be the quality of sleep that can affect the level of HBA1c. The results of the study are consistent with another cross sectional study used baseline data from 317 Hispanic adults with uncontrolled type 2 diabetes. The results of the study showed that sleep duration was not significantly associated with glycemic control when adjusting for insulin (Klessi & Emilly, 2017). Another study of the literature investigated the association of sleep quality with the glycaemic control and the impact on type 2 diabetic patients in Asian population. It showed both sleep quality and less efficient sleep are significantly correlated with worse glycaemic control in patients with type 2 diabetes (Yen, Nai, & Tao, 2012), and there is no effect of sleeping hours.

Moreover, a study conducted on 194 patients, had a mean age of 58 years, and had average HBA1c of 7.5. The study concluded that later chronotype (who go to bed late), tended to be younger and have higher BMI, have also higher HbA1c levels, and are more likely to use insulin, but there was no difference by diabetes duration or complication (Tucker, 2013). Therefore, the quality and the timing of sleep has the effect on blood sugar more than the sleeping hours

Table 4.13: Distribution of study participants according to total health care provider score

Status	Mean	Minimum	Maximum	Std.	t	p
Controlled	81.85	40	100	11.30	0.347	0.729
Uncontrolled	81.47	46	100	11.01		
Total	81.66	40	100	11.15		

4.11Distribution of study participants according to health provider approach

As shown in (table 4.13): the overall mean for satisfaction related to health provider approach is 81.66, for controlled cases the mean is 81.85, however for uncontrolled cases the mean is 81.47.

As shown in (table 4.13): The researcher studied the relationship between health provider approach and the control of diabetes using independent sample t-test. There was no significant differences between health provider approach among controlled and uncontrolled cases of diabetes as evidenced by (t 0.347, p value 0.729)and this is consistent with a study conducted to assess comprehensive approach of clinicians as well as the patient and to link those approach to glycemic control. This study did not find association between provider approach and glycemic level. This could have been the result of the organizational structure of the study site, the conclusion of the study illustrated that individual provider approach had limited ability to predict glycemic control or likelihood of treatment intensification. These data may suggest that systems of care may contribute more to glycemic control among patient populations compared with individual provider approach . Improving systems of care, such as disease-management services, may be a better use of resources than focusing on individual providers (LeBlanc, Rosales, & Kachro, 2015).

In general, all the cases either the controlled or the uncontrolled have the same provider, which is UNRWA; the satisfaction from the services is relatively high among all health centres except small differences. UNRWA provide quality NCD services to the Palestinian refugees supported by strong management and monitoring system. UNRWA focus on NCD services as the burden of NCD is increasing in the last decades and the cost of management of NCD and its complications is very high.

Table (4.14): The level of satisfaction between health care providers in the five Governorates:

Dependant variables	Independent Variables		Mean	Factor	Significance
Satisfaction	Governorates	North	82.7	F 3.74	0.006
		Gaza	83.53		
		Middle Zone	82.289		
		Khanyounis	77		
		Rafah	81		

The researcher used the Questionnaire for the health provider approach , to measure and compare the level of satisfaction in the five Governorates. As shown in (table 4.14): One-Way ANOVA test was used to test the differences in the satisfaction in 5 governorates, there was significant differences in the level of satisfaction in at least in two Governorates as evidenced by (F3.74, p 0.006). The significant differences was level of satisfaction was in Gaza governorate; however, the lowest level was in Khanyounis (Annex 10).

Table (4.15): Distribution of study participants according to Social Support

Type of support	Status	Nu.	Mean	Std.
Medication	**Controlled**	198	81.86	11.31
	Uncontrolled	200	81.5	11.02
Blood Sugar testing	**Controlled**	199	56.5	24.9
	Uncontrolled	200	56.5	24.1
Diet	**Controlled**	199	55.0	23.7
	Uncontrolled	200	54.1	21.9
Emotional support	**Controlled**	199	72.5	22.5
	Uncontrolled	200	73.1	21.1
Exercise	**Controlled**	199	77.2	22.1
	Uncontrolled	200	76.4	19.4
Social support total	**All cases**	399	65.1	17.5
Correlation between total social support and HBA1c : R 0.030, P 0.555				

4.12 Distribution of study participants according to social support

As shown (table 4.15): The mean for social support among all cases was 65.1; the highest mean was for medication, meaning that the highest care from others toward diabetic patients was being sure that they are taking medication. However, the mean for diet in social support was low although diet is one of the major issues that we should focus among diabetic patients.

As shown in (table 4.15): a correlation test was performed to study the relationship between social support and HBA1c, the test showed no significant relationship between social support and the level of HBA1c as evidenced by (R 0.030, p 0.555).

This is consistent with the results of other study conducted in to examine the prevalence of social support and its association with glycemic control in patients with type two diabetes mellitus in an urban primary care center. The study was cross sectional using self-

administered questionnaire; the conclusion of the study was that social support was not associated with glycemic control in adult patients with type 2 diabetes in this primary care setting (Chew & Khow, 2015). This may be due to the difficulty of the definition and measurement of social support, it is a perceived issue and it is difficult to express it.

Table (4.16): The difference of social support between male and female

Gender	Number	Mean	Std.	t	Sig.
Male	132	69	16.1	3.135	0.002
Female	266	63.2	17.9		

As shown in (table 4.16): The mean for social support for males was 69 while for females it was about 63. Independent sample t test was used to test the differences of social support between male and females and it showed significant differences with (t 3.135 and p value of 0.002). This is not strange in our society as the males have more support from his wife and other family members than females who have more responsibilities than males according to our culture.

Chapter 5
Conclusion and Recommendations

5.1Conclusion

This quantitative, cross sectional study aims to assess the relationship between social determinants of health and the control status of type 2 diabetes at UNRWA Health Centers in Gaza Strip.

As mentioned in Chapter 1,the researcher used four domains for the social determinants; the first one was the sociodemographic variables, which include income, housing, living conditions, education level, gender and age. The second domain that was studied is the health behaviors, which included all practices in daily life, smoking, exercise, nutrition, adherence to treatment, type of treatment, obesity, comorbid conditions and psychological distress. The third domain that was studied is health care provider approach, the quality of care provided to patients, counseling, education variables and the level of HBA1c to identify any correlation relationships between these variables and the control status of diabetes.

In this study, the researcher present the possible mechanisms linking the social determinants to the health of persons with diabetes mellitus especially in Gaza Strip which has a unique difficult conditions due to bad political, social and economic conditions.

The study showed that some of the socio-demographic variables affect the control status of diabetes, such as age meaning, increasing age improve the control of diabetes, this may be because younger patients live more sedentary life style which badly affect the blood sugar, but older patients are more caring and adopt more healthy life style. Finally the forth domain that was studied is social support, emotional and physical support from family members, spouse or friends.

All the four domains were studied in relation to the control status of diabetes, comparing thedifferences of these variables among controlled and uncontrolled cases; in addition study the relationships between these variables and the level of HBA1c.

The researcher found that the income has also an effect on the control of diabetes, meaning that patients with sufficient income have better control status than patients with insufficient income.

In addition, the source of income has also an effect on the control of diabetes, patients who have retirement salary or NGOs support has better control status than other patients do, this could be related to the feeling of income security.

Being employed or not has no relationship with the control of diabetes, but there is a positive relationship with age when left the job, meaning that when patients left the job at older age has better control than patients who left the job at younger age. It could be a reciprocal relationship, which mean that poor control of blood sugar increase morbidity and affect the quality of life, making patients less productive, on the other hand staying home with no work may put patients under stress, make more elevation in blood sugar.

Conversely, the study showed no relationships between gender, marital status andeducational level and the control of diabetes.

Concerning the second domain of the study, health behaviors, some of the health behaviors have an effect on diabetes. The researcher found that being smoker has no effect on the control of diabetes, but on the other hand, there is strong association between the number of having nergela per day and the level of HBA1c. About medication, patients who are taking insulin have higher level of HBA1c than other who are taking oral medication.

Concerning eating habits, some eating practices have an effect on the control status of diabetes such as preferring grilled options of diet when available rather than fried food, removing fat from meat before eating, regularly drinking sweet fizzy drinks and eating snacks between meals.

Regarding BMI, there is relationship between being obese or overweight and the control of diabetes.Related to exercise, the study found no relationships between regular exercise and the control of diabetes, may be due to that the culture of exercise among diabetic patients is not well developed. However, feeling motivated to exercise has relationship with the control of diabetes. Having comorbid condition such as HTN or Heart disease has a relationship with the control of diabetes, this may be due to that all of these diseases has the same risk factors and being together make the control of diabetes more difficult.

As its well known that psychological distress affect mental and physical health, the researcher found positive relationship between psychological distress and the level of

HBA1c, meaning that increasing the level of psychological distress , increase the level of HBA1c or vice versa.

The study showed significant negative relationship between the level of psychological distress and income, meaning that decreasing the income will increase the level of stress and this result isexpected. Living in poverty creates an extreme amount of economic, emotional and physical stress.

In addition, the study showed negative relationship between psychological distress and social support, so we can imply that patient with less social support suffer from higher psychological distress. Moreover, there was a significant difference of the level of distress between males and females in favor for females, which mean that females are more exposed to stress than males. Females have more responsibilities than males, taking care of their homes, children and families in addition to work outside in some cases and this may expose them to over stress.

Concerning social support, the researcher found significant differences between social support and gender. Men receive more social support than women do and this is expected in our society as our culture is more supportive to men than women.

The researcher found no relationship between social support and control of diabetes. This could be that all patients, controlled and uncontrolled are living at the same context and the same culture. There are no major differences of social support in our society, as most people live in extended families and have close relationships with each other.

Regarding the health provider approach, the study showed no relationship between health provider approach and the control of diabetes. This is may be due to that the study was conducted only in UNRWA, one main health care provider that provide quality of NCD care, so the effect on the control status could not be observed.

Finally , we can conclude that some of the social determinants of health have an effect on the control status of diabetes and working on these determinants in addition to medical care have profound impact on the control of diabetes and may improve the health of diabetic patients and decrease mortality and morbidity rate.

5.2Recommendations

1. More effort should be done to address the social determinates that affect the control status of diabetic patients.
2. More coordination and collaboration between health care practitioners and policy makers, education sector, social services providers and families of diabetic patients are needed to control diabetes and decrease its morbidity rate
3. In addition to medical care, focus on the social to improve the health of diabetic patients
4. Working on mechanisms or interventions to decrease the level of psychological distress to have better control of blood sugar
5. More income and financial support are needed for diabetic patients to improve their health and their control status,
6. Nutritional support should be enhanced for diabetic patients through education and counseling and enhance the availability of healthy food for them.
7. Family members, friends, colleagues are part of patients' natural support network and can play a role in the provision of social support so involving natural support resources in intervention programs may produce more successful outcomes
8. The group therapy for chronically ill patients must be an integral part of their medical care such as group counseling and education as this may improve the psychological condition for those patients and may enhance their compliance

5.3 Recommendations for further research studies

1. There is a need to conduct more research studies to address the effect of social determinants on the health of diabetic patients
2. More research studies are needed to be conducted at other health institutions such as MOH, NGOs to address the effect of health care provider on the control of diabetes.
3. More research studies are needed to study social determinants of health in more detail especially the role of life style in management of diabetes.
4. There is a need to study the relationship between the social determinants of health and other diseases such as hypertension or cardiac disease.

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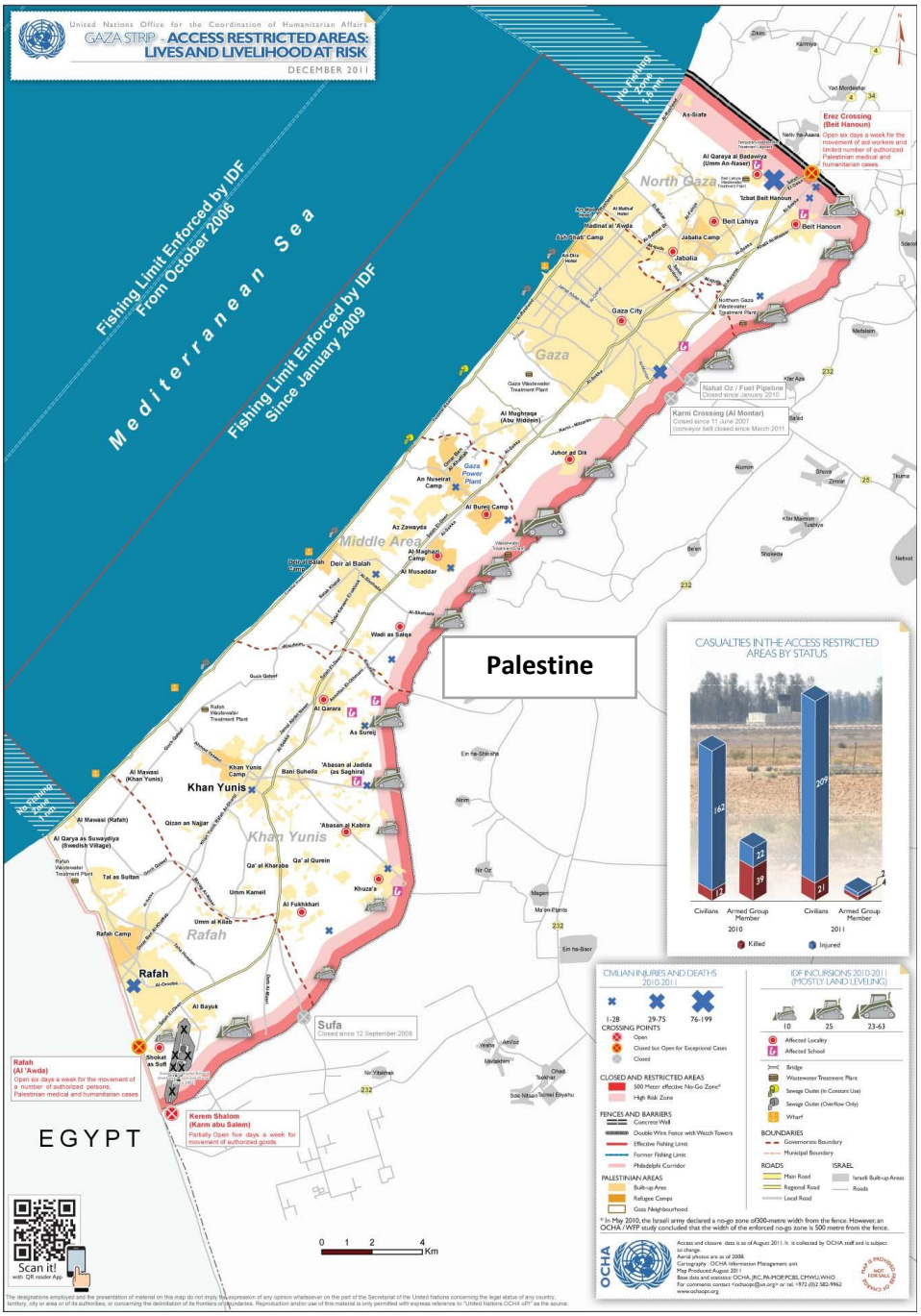
Annexes

Annex 1: Map of Gaza Strip:



Map of the Gaza Strip (Dec 2011):United Nations Office for the Coordination of Human Affairs in Occupied Palestinian Territory

Annex 2: Helsinki committee approval letter

المجلس الفلسطيني للبحث الصحي

Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار

Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee
For Ethical Approval

Date: 2017/08/07 **Number:** PHRC/HC/229/17

Name: NESREEN Z. ELHALABY الاسم:

We would like to inform you that the committee had discussed the proposal of your study about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Relationship between Social Determinants of Health and Control Status among Type 2 Diabetic Patients at UNRWA Health Centers in Gaza Governorates

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/229/17 in its meeting on 2017/08/07

و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member **Member**

Chairman

Genral Conditions:-

1. Valid for 2 years from the date of approval.
2. It is necessary to notify the committee of any change in the approved study protocol.
3. The committee appreciates receiving a copy of your final research when completed.

Specific Conditions:-

E-Mail:pal.phrc@gmail.com

Annex (3): Official letter from al Quds University to UNRWA:

Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة

التاريخ 2017/9/5

Approved.

حضرة / د. غادة أبو نحلة المحترم
مدير برامج الصحة بوكالة الغوث الدولية
السلام عليكم ورحمة الله،،،

الموضوع: مساعدة الطالبة نسرين الحلبي

نشكر لكم دعمكم الدائم لمسيرة العلم والتعليم وخصوصاً دعم كلية الصحة العامة وطلابها، ونود أعلامكم بأن الطالبة المذكورة أعلاه تقوم بعمل بحث كمتطلب للحصول على درجة الماجستير في الصحة العامة-مسار علم الأوبئة عنوان:

Relationship between Social Determinants of Health and Control Status among Type 2 Diabetic Patients at UNRWA Health Centers in Gaza Governorates

وعليه نرجو من سيادتكم التكرم بالموافقة على تسهيل مهمة الطالب في إنجاز هذا البحث حيث تشمل عينة الدراسة مرضى السكر من النوع الثاني المتابعين في عيادات الوكالة التابعة لإدارتكم الموقرة لتعبئة استبانة معهم والرجوع لملفاتهم لمعرفة مخزون السكر لهم.

شاكرين لكم حسن تعاونكم ودعمكم للمسيرة التعليمية،،،
و اقبلوا فائق التحية و الاحترام،،،

د. بسام أبو حمد
منسق عام برامج الصحة العامة
جامعة القدس-فرع غزة

نسخة الملف

Jerusalem Branch/Telefax 02-2799234
Gaza Branch/Telefax 08-2644220 -2644210
P.O. box 51000 Jerusalem

فرع القدس / تلفاكس 02-2799234
فرع غزة / تلفاكس 08-264420-2644210
ص.ب. 51000 القدس

Annex (4): Sample size calculation: Sample Size

Table 8.4 Sample sizes based on the 95% confidence level and 5% level of precision for populations of 10 to 1 000 000

N	n	N	n	N	n	N	n
10	10	110	86	300	169	1 000	278
15	14	120	92	320	175	1 500	306
20	19	130	97	340	181	2 000	322
25	24	140	103	360	186	3 000	341
30	28	150	108	380	191	3 500	346
35	32	160	113	400	196	4 000	351
40	36	170	118	420	201	4 500	354
45	40	180	123	440	205	5 000	257
50	44	190	127	460	210	6 000	361
55	48	200	132	480	214	7 000	364
60	52	210	136	500	217	8 000	356
65	56	220	140	550	226	9 000	368
70	59	230	144	699	234	10 000	370
75	63	240	148	650	242	50 000	381
80	66	250	152	700	248	75 000	382
85	70	260	155	750	254	100 000	384

Annex (5): Sampling Criteria

UNRWA Clinic	North	Gaza	Mid Zone	Khanyounis	Rafah	Total
Large clinic	2	3	2	1	1	9
Small clinic	2	2	3	3	3	13
Total	4	5	5	4	4	22

Annex (6): Sampling Process:

Diabetic cases	Number of type 2 diabetes cases	Percentage% from the sample	Number of cases in the sample
North Gaza	7958	20	80
Gaza	11081	27	108
Middle Gaza	8659	21	84
Khanyounis	7074	17	68
Rafah	5927	15	60
total	40699	100	400

Annex (7): Distribution of patients in health centers

Health centers	Number of diabetic cases	Percentages% from the area	Number of cases from the sample
North Gaza 2 HC	6672	20	80
North Gaza HC	1835	27%	22
Jabalia HC	4837	73%	58
Gaza (2HC)	5444	27	108
Remal HC	3892	71%	77
Beach HC	1552	29%	31
Middle Gaza (2HC)	4557	21	84
Nusirat HC	3110	69%	58
Burej HC	1447	31%	26
Khanyounis (2HC)	4362	17	68
Khanyounis HC	3280	75%	51
Jabanese HC	1082	25%	17
Rafah	3073	15	60
Rafah HC	2737	89%	53
Shouka HC	336	11%	7

Annex (8): Tables of Reliability and Validity

Reliability

Items	Cronbach's Alpha
Health providers' behavior	0.807
Social Support	0.885

Validity of Health providers' behavior

Health providers behavior	R	Sig.
1. Does the provider friendly welcome you?	0.519	0.000
2. Does the provider ensure privacy while consulting you?	0.461	0.000
3. Does the provider encourage you to ask Questions?	0.590	0.000
4. Does the provider explain to you the possible complications of your disease?	0.740	0.000
5. Has the provider eye to eye contact with you?	0.550	0.000
6. Does the provider explain the medication and the doses for you?	0.677	0.000
7. Does the provider provide counseling about diet?	0.720	0.000
8. Does provider provide counseling about life style?	0.713	0.000
9. Does the provider provide you with feedback about your condition?	0.698	0.000
10. Does the organization have continuous supply of medication?	0.344	0.000

Validity of Social Support

Social support	R	Sig.
Do you have someone who gives you your medication?	0.638	0.000
Do you have someone remind you to take your medication?	0.703	0.000
Do you have someone who checks if you have taken your medication?	0.750	0.000
Do you have someone who tests your blood sugar?	0.568	0.000
Do you have someone who reminds you to test your blood sugar?	0.708	0.000
Do you have someone who watch you and notice if you have signs of high or low blood sugar?	0.734	0.000
Do you have someone who encourages you to eat the right food	0.686	0.000
Do you have someone who joins you in eating the same food as you?	0.647	0.000
Do you have someone who cooks for you the meals that fit your meal plan?	0.631	0.000
Do you have someone who can listen to your worries and concerns about diabetes?	0.561	0.000
Do you have someone who encourages you to take care of your diabetes?	0.673	0.000
Do you have someone who understands the difficulties you face in managing your diabetes?	0.659	0.000
Do you have someone who remind you to exercise	0.638	0.000
Do you have someone who joins you in exercise?	0.703	0.000
Do you have someone who suggests ways for exercising?	0.750	0.000

Annex (9): Tables of means

variables	Status	Mean	Minimum	Maximum	Std.
Age	Controlled	58.5	23	80	10.943
	Uncontrolled	54.7	21	75	9.314
	Total	56.6	21	80	10.324
HbA1c	Controlled	6.46	4.7	7.0	0.612
	Uncontrolled	10.15	8.0	18.0	2.03
	Total	8.2	4.7	18	2.29
BMI	Controlled	32.09	20	53	5.859
	Uncontrolled	31.8	19	58	6.043
	Total	32.94	19	58	5.964
Income	Controlled	1300.06	50	6400	1117.828
	Uncontrolled	1189.42	30	6400	1102.280
	Total	1242.67	30	6400	1109.430
Psychological Distress	Controlled	3.58	0	12	2.741
	Uncontrolled	3.85	0	12	2.699
	Total	3.72	0	12	2.72
Psychological Distress	Male	3	0	9	2.272
	Female	4.05	0	12	2.849
	total	3.7	0	12	2.715
Social support	Male	69	25	100	16.12
	Female	63.2	20	100	17.9
	Total	65.1	20	100	17.53
Health care providers	Controlled	81.85	40	100	11.3
	Uncontrolled	81.47	46	100	11.01
	Total	81.66	40	100	11.15
Hba1c	Sufficient income	7.83	4.7	16	2.18
	Insufficient income	8.33	4.8	18	2.3
	Good Living conditions	7.81	4.7	16	2.0
	Accepted living conditions	8.05	4.8	16	2.14
	Bad Living conditions	8.65	5.5	18	2.6
HBA1c	Crowding index 1	7.57	4.7	18	2.06
	Crowding index 2	8.36	5.4	16	2.1
	Crowding index 3	8.5	5.5	16	2.57
	Crowding index 4	8.2	5.5	16	2.48
	Male	8.23	4.9	16	2.34
	Female	8.18	4.7	18	2.27
	Oral treatment	7.857	4.7	18	2.16
	Insulin	8.86	5.7	16	2.57
	Oral and insulin	8.2	4.9	16	2.26

Annex (10): Tables of ANOVA, Tukey:

Dependent Variable: HBA1cTukey HSD

	Source of income	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Current Work	Retirement Salary	.61536	.36951	.556	-.4431	1.6738
	Social Affairs	-.36494	.31765	.860	-1.2748	.5449
	NGO's Support	.52352	.67311	.971	-1.4045	2.4516
	Relative Support	-.07026	.40979	1.000	-1.2441	1.1035
	Other	-.76188	.40432	.413	-1.9200	.3963
Retirement Salary	Current Work	-.61536	.36951	.556	-1.6738	.4431
	Social Affairs	-.98030	.34589	.054	-1.9711	.0105
	NGO's Support	-.09184	.68689	1.000	-2.0594	1.8757
	Relative Supprt	-.68562	.43205	.608	-1.9232	.5519
	Other	-1.37724*	.42687	.017	-2.6000	-.1545

Dependent Variable: HBA1C Tukey HSD

(I)living conditions	(J) living conditions	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-.24781	.28692	.664	-.9228	.4272
	3.00	-.84647*	.29711	.013	-1.5455	-.1475
2.00	1.00	.24781	.28692	.664	-.4272	.9228
	3.00	-.59866	.26821	.067	-1.2297	.0323
3.00	1.00	.84647*	.29711	.013	.1475	1.5455
	2.00	.59866	.26821	.067	-.0323	1.2297

*. The mean difference is significant at the 0.05 level. 1= Good, 2= Moderate, 3 =Bad

Dependent Variable: HBA1c Tukey HSD

(I) Type of Drugs	(J) Type of Drugs	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Oral	Insulin	-1.00461*	.34231	.010	-1.8099	-.1993
	Both	-1.34876*	.30689	.000	-2.0707	-.6268
Insulin	Oral	1.00461*	.34231	.010	.1993	1.8099
	Both	-.34415	.41985	.691	-1.3319	.6436
Both	Oral	1.34876*	.30689	.000	.6268	2.0707
	Insulin	.34415	.41985	.691	-.6436	1.3319

Dependent variable level of psychological distress Tukey HSD

(I) Q06.Education	(J) Q06.Education	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Illiteracy	Primary	.576	.546	.941	-1.04	2.19
	Preparatory	1.347	.520	.132	-.20	2.89
	Secondary	1.551*	.500	.034	.07	3.03
	Diploma	2.060*	.597	.011	.29	3.83
	University	2.833*	.642	.000	.93	4.74
	Higher Education	2.083	1.092	.476	-1.15	5.32
Primary	Illiteracy	-.576	.546	.941	-2.19	1.04
	Preparatory	.771	.425	.540	-.49	2.03
	Secondary	.975	.401	.187	-.21	2.16
	Diploma	1.484	.516	.064	-.05	3.01
	University	2.257*	.568	.002	.57	3.94
	Higher Education	1.507	1.050	.782	-1.60	4.62
Preparatory	Illiteracy	-1.347	.520	.132	-2.89	.20
	Primary	-.771	.425	.540	-2.03	.49
	Secondary	.204	.365	.998	-.88	1.29
	Diploma	.713	.489	.770	-.74	2.16
	University	1.486	.543	.092	-.12	3.10
	Higher Education	.736	1.037	.992	-2.34	3.81
Secondary	Illiteracy	-1.551*	.500	.034	-3.03	-.07
	Primary	-.975	.401	.187	-2.16	.21
	Preparatory	-.204	.365	.998	-1.29	.88
	Diploma	.509	.468	.931	-.88	1.90
	University	1.282	.524	.182	-.27	2.84
	Higher Education	.532	1.027	.999	-2.51	3.58
Diploma	Illiteracy	-2.060*	.597	.011	-3.83	-.29
	Primary	-1.484	.516	.064	-3.01	.05
	Preparatory	-.713	.489	.770	-2.16	.74
	Secondary	-.509	.468	.931	-1.90	.88
	University	.773	.617	.873	-1.06	2.60
	Higher Education	.023	1.077	1.000	-3.17	3.22
University	Illiteracy	-2.833*	.642	.000	-4.74	-.93
	Primary	-2.257*	.568	.002	-3.94	-.57
	Preparatory	-1.486	.543	.092	-3.10	.12
	Secondary	-1.282	.524	.182	-2.84	.27
	Diploma	-.773	.617	.873	-2.60	1.06
	Higher Education	-.750	1.103	.994	-4.02	2.52
	Primery	-1.507	1.050	.782	-4.62	1.60

Dependent Variable: Health Provider characteristics

Tukey HSD

(I) Q05.Address	(J) Q05.Address	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
North	Gaza	-.78236	1.62474	.989	-5.2349	3.6702
	Middle Zone	.46694	1.71296	.999	-4.2274	5.1613
	Khanyounis	5.35610*	1.79026	.024	.4499	10.2623
	Rafah	1.73915	1.87814	.887	-3.4079	6.8862
Gaza	North	.78236	1.62474	.989	-3.6702	5.2349
	Middle Zone	1.24930	1.61926	.939	-3.1882	5.6869
	Khanyounis	6.13846*	1.70083	.003	1.4774	10.7996
	Rafah	2.52151	1.79309	.624	-2.3924	7.4355
Middle Zone	North	-.46694	1.71296	.999	-5.1613	4.2274
	Gaza	-1.24930	1.61926	.939	-5.6869	3.1882
	Khanyounis	4.88916	1.78529	.050	-.0034	9.7817
	Rafah	1.27221	1.87340	.961	-3.8618	6.4062
Khanyounis	North	-5.35610*	1.79026	.024	-10.2623	-.4499
	Gaza	-6.13846*	1.70083	.003	-10.7996	-1.4774
	Middle Zone	-4.88916	1.78529	.050	-9.7817	.0034
	Rafah	-3.61695	1.94433	.341	-8.9454	1.7115
Rafah	North	-1.73915	1.87814	.887	-6.8862	3.4079
	Gaza	-2.52151	1.79309	.624	-7.4355	2.3924
	MidZone	-1.27221	1.87340	.961	-6.4062	3.8618
	Khanyounis	3.61695	1.94433	.341	-1.7115	8.9454

*. The mean difference is significant at the 0.05 level.

Annex (11): The questionnaire and the consent form in Arabic and English version:

Al Quds University

School of public health

Relationship between Social Determinants of Health and Control Status among Type 2 Diabetic Patients at UNRWA Health Centers in Gaza Governorates

General Objectives:

The general objective of this study is to assess the relationship between the social determinants and control status among type2 diabetic patients at UNRWA Health Centers in Gaza Strip

Specific objectives:

- To identify the relationship between socio-demographic variables and the control status of type 2 diabetes.
- To recognize the effect of health behavior on the control status among type 2 diabetes.
- To assess the relationship between health care providers characteristics and the control status among type 2 diabetic patients.
- To find out the relationship between social support and control status among type 2 diabetes.
- To develop recommendations based on the results of this study for the proper control of blood sugar among type 2 diabetic patients in the light of social determinants.

Relationship between Social Determinants of Health and Control Status among Type 2 Diabetic Patients at UNRWA Health Centers in Gaza Governorates

Dear participant:

I am Dr. Nisreen El Halaby, a student in al Quds University, conducting a research study about the relationship between social determinants of health and the control status among type 2 diabetic patients in Gaza Governorates. This study is as fulfillment requirement for the master degree of public health.

Your participation in this study will help the researcher to identify the effect of social determinants on the control of type 2 diabetes and may help in the control of this disease. Your participation does not carry any type of risk or cost. The information will be used only for research purposes, it will be treated as confidential, and all reasonable efforts will be made so that no individual participant will be identified with his/her answers.

Approximately 400 hundreds persons will participate in this study and you have been selected to participate in this study randomly. If you agree to participate, you will be asked to fill an interviewed questionnaire. This will take approximately 15 minutes of your time.

There may be some words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them.

Your participation in this study is highly appreciated and it is voluntary. You may choose not to participate, and if you decide to participate, you can change your mind later and withdraw from the study. You are free not to answer any questions.

جامعة القدس – ابو ديس

كلية الدراسات العليا

كلية الصحة العامة

الاخ الفاضل /الاخت الفاضلة:

تحيه طيبة

انا الباحثة نسرين زياد الحلبي طالبة في جامعة القدس ماجستير الصحة العامة تخصص علم الاوبئة – اقوم بإجراء بحث عن تأثير المحددات الاجتماعية على التحكم في مرض السكري النوع الثاني.

مشاركتك في هذه الدراسة سوف تساعد الباحث على معرفة تأثير المحددات الاجتماعية على مرض السكري وبالتالي المساعدة في السيطرة على هذا المرض

مشاركتك في هذا البحث لا تشكل اي خطر او تكلفة عليك والمعلومات المستمدة من هذه الدراسة سوف تستخدم فقط لغرض البحث ولن تستخدم لأي اغراض اخرى وسوف تعامل بطريقه سرية

عدد المشاركين في هذه الدراسة ما يقارب 400 مشارك وقد تم اختيارك للمشاركة في هذه الدراسة بطريقة عشوائية ولك حريه الاختيار بالموافقة او الرفض.

في حال اختيار الموافقة. نثمن هذا الاختيار، سوف نقوم بعمل مقابله تستغرق 15 دقيقه من وقتك ونعلمك انه يمكنك عدم الإجابة عن بعض الأسئلة أو التوقف عن الإجابة متى شئت. إذا كان لديك اي استفسار يمكنك ان تستوقفني وتطلب الشرح اللازم.

مع جزيل الشكر والتقدير

الباحثة: نسرين زياد الحلبي

Questionnaire

Serial number: _____

1. Socio-demographic variables

1. Name: _____
2. Age: _____
3. Gender : Male □ Female □
4. Marital status: Single □ Married □ Divorced □ Widow □
5. Address: _____
6. Education:
   - Are you illiterate □ literate □ Primary □ Secondary □ tertiary □ diploma □ university □ above □ or calculate years of schooling?
7. Work:
   - Do you work Yes □ No □
   - If yes: What is your occupation? _____
   - If No, have you ever worked? Yes □ No □
   - What was your age when you left your job? _____
   - Why are you not working now?

     No work opportunity □ No desire to work □ I don't need to work □

     Health conditions □ others, specify _____
8. Income:
   - What's your income?_____ ILS
   - What is the source of your income:

     Current work □ retirement pension □ social welfare □

     Support from NGOs □ family member support □ other □
   - Is your income sufficient?

     Yes □ No □

     What do you do when your income is not sufficient?

     Self-belonging □ borrow economize in spending □

     perform other activities to have more income □ other □
9. Housing:
   - Is your house : Owned □ Rented □ Other □

- How many rooms do you have in your home? _____
- How many persons are living in your house? _____
- How do you rate your overall living conditions**?**

  Bad □ Acceptable □ Good □

- What make you annoyed in your house?

Not enough space □ loneliness □ not caring □ No privacy □ noise because of children □ others, specify _____

- Do you have other source of electricity in your home? Yes □ No□

  If yes specify _____

10. Diabetes:

- Do you have type 2 diabetes : Yes □ No □

  If yes what is your HBA1c? _____ (check records)

- Do you have any other chronic disease: Yes □ No □

  If yes, specify: HTN □ Renal disease □ Respiratory disease□

  Heart disease □others

- Does any member of your family has diabetes? Yes □ No □

  If yes, what is the relationship? Father □ Mother □ Sister or brother □

  Son or daughter □

- For how many years, do you have diabetes? _____
- Do you adhere to your appointment in the clinic?

  Yes, most of the time □ sometimes □ Not at all □

- Do you have self-monitoring of blood sugar at home? Yes □ sometimes □

  No □

- What is your weight and BMI? _____
- How do you come to the clinic? Use transportation□walk to the clinic□
- If you walk how much time does it take? _____
- If you use transportation, how much does it cost? _____

2. Health behavior:

- **Medication:**

1. Do you take your medication as prescribed?

Yes, most of the time□ sometimes □ Not at all □

2. Do you take your medication at the proper time?

Yes, most of the time□ sometimes □ Not at all □

3. What type of medication do you take for your diabetes?

Oral medications □ Insulin injections □ both, oral and insulin □

4. How many drugs do you take for your disease? _____

- **Smoking:**

1. Do you smoke?

Yes mostly cigarettes □ yes mostly nargela □ Yes-cigarettes and nargela □ smoke in the past but quit smoking □ doesn't smoke now and in the past □

2. If yes how many cigarettes per day? _____ For how long duration? _____
3. If you smoke nargela, how many times per day? _____

- **Nutrition:**

Questions	Always	Sometimes	Never
1.Do you skip breakfast more than once a week?			
2, Do you skip breakfast more than once a week?			
3.Do you skip evening meals more than once a week?			
4.Do you skip meals and snack instead on most days?			
5.Do you eat more than 5 portions of fruit and/or vegetablesevery day?			
6.Do you eat more than 4 different varieties of fruit each week?			
7.Do you choose low-fat products when available?			
8.Do you choose baked, steamed or grilled options when available,rather than fried foods (such as crisps and snacks, or fish and chips)?			
9.Do you opt for lean cuts of meat or remove visible fat – for example,removing the skin on chicken or the rind on bacon?			
10.Did you eat any oily fish last week?			
11. Do you include some unsalted nuts and seeds in your diet?			
12.Do you regularly choose wholemeal bread or rolls rather than white			
13.Do you add sugar to your drinks?			
14.Do you regularly drink sweet fizzy drinks?			
15.Do you regularly eat cakes, sweets, chocolate or biscuits at work?			
16.Do you regularly add salt to food during cooking?			
17.Do you regularly eat snacks between meals? (sand witches, prepared food)			

- **Psychological distress:**

Have you recently:

Psychological distress	**Yes**	**No**
1. Been able to concentrate on what you are doing?		
2. Lost much sleep over worry?		
3. Felt you are playing useful part in things?		
4. Felt you are capable of making decisions about things?		
5. Felt constantly under strain?		
6. Felt you couldn't overcome your difficulties?		
7. Been able to enjoy your day to day activities?		
8. Been able to face up your problems?		
9. Been feeling unhappy and depressed?		
10. Been losing confidence in yourself?		
11. Been thinking of yourself as worthless person?		
12. Been feeling reasonably happy, all thing considered?		

- **Sleeping**

How many hours on average do you sleep each night? _____

Do you have difficulties with staying sleep?

Yes, most of the time □ sometimes□ not at all□

Do you weak up during the night?

Yes, most of the time □ sometimes□ not at all□

If yes what is the cause_____

3. Health providers' behavior?

Please check (√) and rate yourself honestly on what you actually feel using the following scale

Never □ almost never□ sometimes □ fairly often □ very often □

2. Health providers characteristics	**Never**	**Almost never**	**Some times**	**Fairly often**	**Very often**
11. Does the provider friendly welcome you?					
12. Does the provider ensure privacy while consulting you?					
13. Does the provider encourage you to ask Questions?					
14. Does the provider share you the treatment plan ?					
15. Has the provider eye-to-eye contact with you?					
16. Does the provider explain the medication and the doses for you?					
17. Does the provider provide counseling about diet?					
18. Does provider provide counseling about life style?					
19. Does the provider provide you with feedback about your condition?					
20. Does the organization have continuous supply of medication?					

3. Social support

3. Social support	**Never**	**Almost never**	**Some times**	**Fairly often**	**Very often**
Medication					
1. Do you have someone who gives you your medication?					
2. Do you have someone remind you to take your medication?					
3. Do you have someone who checks if you have taken your medication?					
Blood sugar testing					
1. Do you have someone who tests your blood sugar?					
2. Do you have someone who reminds you to test your blood sugar?					
3. Do you have someone who watch you and notice if you have signs of high or low blood sugar?					
Diet					
1.Do you have someone who encourages you to eat the right food					
2. Do you have someone who joins you in eating the same food as you?					
3. Do you have someone who cooks for you the meals that fit your meal plan?					
Emotional support:					
1. Do you have someone who can listen to your worries and concerns about diabetes?					
2. Do you have someone who encourages you to take care of your diabetes?					
3. Do you have someone who understands the difficulties you face in managing your diabetes?					
Exercise					
1.Do you have someone who remind you to exercise					
2. Do you have someone who joins you in exercise?					
3. Do you have someone who suggests ways for exercising?					

استبانة

الرقم المتسلسل:_____ تاريخ المقابلة: _____

التصنيف: □سكري منتظم □سكري غير منتظم

نسبة الهيموغلوبين السكري_____ مؤشر كتلة الجسم _____

أولاً: المتغيرات الاجتماعية والديمغرافية:

1. **الاسم:** _____
2. **العمر:** _____
3. **الجنس:** □ ذكر □أنثى
4. **الحالة الاجتماعية:** □ أعزب □متزوج □منفصل □ أرمل
5. **العنوان:**□شمال القطاع □غزة □الوسطى□خانيونس□رفح
6. **المستوى التعليمي:** □غير متعلم □ الابتدائي □الإعدادي

□ الثانوي □ دبلوم □ جامعي □ فما فوق

7. **العمل:**

هل تعمل؟ □ نعم □ لا

إذا كانت الاجابة نعم: ما هي وظيفتك؟ _____

إذا كانت الإجابة لا، هل كنت تعمل؟ □ نعم □لا

كم كان عمرك عندما توقفت عن العمل؟ _____

لماذا لا تعمل الان؟

□عدم توفر فرص عمل□عدم الرغبة في العمل□عدم الحاجة للعمل

□الوضع الصحي□أسباب اخري حددها _____

8. **الدخل الشهري:**

- كم دخلك الشهري بالشيكل؟ _____

- ما هو مصدر دخلك؟

□عملي الحال□راتب التقاعد□الشئون الاجتماعية

□دعم من مؤسسات غير حكومية□دعم من أحد الأقارب□أخرى

- هل دخلك الشهري يكفي لسد احتياجاتك الأساسية؟

□نعم □لا

- ماذا تفعل إذا كان دخلك غير كاف؟

□استدين□اخفض المصاريف قدر المستطاع□اشتغل عمل إضافي

□ مساعدة من الآخرين او الأقارب□أخرى

9. المسكن:

- هل مسكنك؟ □ملك □ايجار □اخر
- ما نوع مسكنك؟ □مسكن منفصل□شقة □غرفة او جناح □خيمة □أخرى
- كم غرفة لديك في منزلك؟ _____
- كم شخص يعيش في منزلك؟ _____
- كيف تقيم وضعك المعيشي؟□ ممتاز □ جيد□ مقبول □ سيء □ سيء جدا
- ما أكثر شيء يضايقك في المنزل؟

□ازدحام المنزل الشعور بالوحدة □عدم الاهتمام □عدم مراعاة الخصوصية

□الضوضاء من الأطفال □انقطاع التيار الكهربائي

□أسباب أخرى حددها _____

- هل لديك مصادر بديلة لتوفير الكهرباء؟ □ نعم □لا
- إذا كانت الإجابة نعم، حددها؟ _____

10. مرض السكري:

- هل انت مصاب بمرض السكري النوع الثاني؟ □نعم □لا
- ما هي نسبة الهيموغلوبين السكريلديك؟ _____

- هل تعاني من مرض مزمن اخر؟ □نعم □لا
- إذا كانت الإجابة نعم، حددها؟

□ضغط □ أمراض كلى □ أمراض جهاز تنفسي

□ أمراض قلب □أمراض روماتيزمية □غدة درقية

□اوعية دمويةأخرى حددها: _____

- هل يعاني أي من أفراد اسرتك من مرض السكري؟ □نعم □لا

إذا كانت الإجابة نعم فما هي صلة القرابة:

□ أب □أم □أخ أو أخت □أبن أو ابنة □أخرى حددها

- منذ متى تعاني من مرض السكر؟ _____
- هل أنت ملتزم بمواعيد المراجعة في العيادة؟ □ دائما □ أحيانا □ مطلقا
- هل تقوم بقياس نسبة السكر في الدم بنفسك في المنزل؟ □ دائما □ أحيانا □ مطلقا
- ما هو مؤشر كتلة الجسم لديك؟ _____
- كيف تأتي الى المركز الصحي؟ □مشيا على الاقدام □استخدم المواصلات

□الاثنين

- إذا كنت تأتي مشيا على الاقدام كم تستغرق من الوقت؟ _____
- إذا كنت تستخدم المواصلات كم تكلفك؟ ؛_____

ثانياً: السلوك الصحي:

1. الادوية:

- هل تتناول علاجك كما هو مقرر لك؟ □ دائما □ أحيانا □ مطلقا
- هل تأخذ علاجك في الوقت المحدد له؟ □ دائما □ أحيانا □ مطلقا
- ما نوع الدواء الذي تتعاطاه لعلاج السكري؟

□العلاج عن طريق الفم □الانسولين □ الاثنان معا

- ما عدد الادوية التي تتعاطاها؟ _____

2. التدخين:

- هل تدخن؟

□نعم غالبا سجائر□نعم غالبا الارجيلة□نعم غالبا أرجيلة وسجائر

□مدخن في الماضي وأقلعت عن التدخين□غير مدخن في الماضي أو حاليا

- إذا كانت الإجابة نعم: كم سيجارة تدخن يوميا _____

- إذا كنت تدخن الأرجيلة كم مرة يوميا: _____
- هل هناك أحد من أفراد عائلتك مدخن؟ □نعم □لا

3. الضغط النفسي:

الرقم	مقياس الصحة العامة	نعم	لا
1	هل كنت قادرا على التركيز؟		
2	هل اضطرب نومك بسبب القلق؟		
3	هل شعرت بانك تقوم بدور مهم في الحياة؟		
4	هل شعرت بانك قادر علي اتخاذ القرارات؟		
5	هل شعرت بانك تحت الضغط بشكل مستمر؟		
6	هل شعرت بانك قادر علي تجاوز المصاعب؟		
7	هل استمتعت بنشاطاتك اليومية العادية؟		
8	هل كان لديك القدرة على مواجهة مشاكلك؟		
9	هل شعرت بانك غير سعيد او مكتئب؟		
10	هل فقدت الثقة بنفسك؟		
11	هل فكرت بانك شخص عديم الفائدة؟		
12	هل شعرت أنك سعيد على وجه العموم؟		

4. التغذية:

الرقم	الأسئلة	دائما	أحيانا	مطلقا
1	هل تمتنع عن تناول طعام الافطار أكثر من مرة اسبوعيا؟			
2	هل تمتنع عن تناول طعام الغداء أكثر من مره اسبوعيا؟			
3	هل تمتنع عن تناول وجبة العشاء أكثر من مره اسبوعيا؟			
4	هل تتجاوز تناول الوجبات الأساسية والوجبات الخفيفة معظم الأيام؟			
5	هل تتناول أكثر من خمسة حصص من الخضار والفواكه يوميا؟ لاحظ هنا ان عصير الفواكه عبارة عن حصة واحدة بغض النظر عن الكمية والحصه عبارة عن ملئكف اليد			
6	هل تتناول أكثر من أربع انواع مختلفة من الفواكه اسبوعيا؟			

7	هل تختار الاطعمة قليلة الدسم عند توافرها؟				
8	هل تفضل الاطعمة المدخنة او المسلوقة على الاطعمة المقلية عند توافرها؟				
9	هل تميل الى اختيار اللحوم قليلة الدهن او تزيل الدهون من اللحوم او الدجاج قبل اكلها؟				
10	هل تناولت اي من منتجات الاسماك خلال الأسبوع؟				
11	هل يشتمل طعامك على الحبوب او البذور الغير مملحة؟				
12	هل تختار بانتظام تناول الخبز الاسمر او القمح بدلا من الابيض؟				
13	هل تضيف السكر لمشروباتك؟				
14	هل تتناول المشروبات الغازيةاو العصائر المحلاة بانتظام او يوميا؟				
15	هل تتناول الحلويات او الكعك او البسكويت خلال النهار؟				
16	هل تضيف الملح الى طعامك؟				
17	هل تتناول الطعام مثل السندويتشات او الطعام الجاهز بين الوجبات الثلاثة؟				

5. النشاط البدني:

الرقم	الأسئلة			
1	هل تتجول في الاماكن او تتنقل عن طريق المشي او الدراجة الهوائية؟	دائما	احيانا	مطلقا
2	هل تفضل استخدام السلالم بدلا من استخدام المصعد؟	دائما	احيانا	مطلقا
3	كم مرة اسبوعيا تمارس الرياضة او المشي لمدة نصف ساعة على الاقل؟	مرة واحدة او اقل اسبوعيا	مرتين او ثلاثة اسبوعيا	أكثر من ثلاث مرات أسبوعيا
4	هل تشعر أنك متحمس لممارسه الرياضة او المشي؟	دائما	احيانا	مطلقا
5	هل تشعر بالتعب او الكسل ا لذي يمنعك من ممارسه الرياضة او المشي؟	دائما	احيانا	مطلقا
6	كم عدد الساعات التي تقضيها يوميا جالسا لمشاهدة التلفاز او تصفح الانترنت؟	ساعة او اقل يوميا	ساعتان او ثلاثة يوميا	أكثر من ثلاث ساعات
7	إذا كنت لا تمارس الرياضة او المشي فما السبب في ذلك؟	عدم الاكتراث	عدم توافر الوقت	الحالة الصحية لا تسمح

النوم:

- كم معدل ساعات نومك يوميا؟ _____
- هل تعاني من صعوبة في النوم؟ □ دائما □ أحيانا □ مطلقا
- هل تستيقظ عدة مرات خلال نومك ليلا؟□ دائما □ أحيانا □ مطلقا
- إذا كانت الاجابة نعم، فما الاسباب؟ _____

رجاءً ضع إشارة (√) وقيم ما تشعر به بوضوح باستخدام التقسيمات التالية:

□ موافق بشدة □ موافق □ محايد □ غير موافق □ غير موافق بشدة

ثالثا: خصائص مقدم الرعاية الصحية:

الرقم	خصائص مقدم الرعاية الصحية	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
1	هل يرحب بك مقدم الخدمة بطريقة ودية؟					
2	هل يحافظ مقدم الخدمة على خصوصيتك خلال تقديم الخدمة؟					
3	هل يشجعك مقدم الخدمة على طرح التساؤلات حول مرضك؟					
4	هل يوضح لك مقدم الخدمة الأمور ذات الصلة بمرضك.					
5	هل ينظر اليك مقدم الخدمة خلال تقديم المشورة؟					
6	هل يشرح لك مقدم الخدمة الامور المتعلقة بالأدوية والجرعات؟					
7	هل يقدم لك مزود الخدمة المشورة حول النظام الغذائي الذي يجب أن تتبعه؟					
8	هل يقدم لك مزود الخدمة المشورة حول أسلوب الحياة الذي يجب أن تتبعه؟					
9	هل يقدم لك مزود الخدمة تغذية راجعة عن وضعك الصحي؟					
10	هل يوفر لك المركز الصحي العلاج بصورة مستمرة؟					

رابعا: الدعم الاجتماعي

الرقم	الدعم الاجتماعي	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
	العلاج:					

1	هل لديك شخص يعطيك الدواء؟					
2	هل لديك شخص يذكرك بموعد تناول العلاج؟					
3	هل لديك شخص يتحقق من تناولك للدواء؟					
	فحص السكر:					
4	هل لديك شخص يقوم بفحص السكر لك؟					
5	هل لديك شخص يذكرك بإجراء الفحص؟					
6	هل لديك شخص يلاحظ عليك علامات ارتفاع أو انخفاض السكر؟					
	النظام الغذائي:					
7	هل لديك شخص يشجعك لتناول الغذاء الصحي؟					
8	هل لديك شخص يشاركك في تناول الغذاء الصحي؟					
9	هل لديك شخص يقوم بتحضير الوجبات التي تناسب وضعك الصحي؟					
	الدعم النفسي والعاطفي:					
10	هل لديك شخص يشاركك همومك ومخاوفك؟					
11	هل لديك شخص يشجعك على مواجهة مرض السكري؟					
12	هل لديك شخص يتفهم الصعوبات التي تواجهها في السيطرة على مرض السكري؟					

Annex (12): Experts and professional consulted:

The study tool (interviewed questionnaire) was reviewed and evaluated by the following experts:

- Dr. Bassam Abu Hamad, Al Quds University
- Dr. Yehia Abed, Al Quds University
- Dr. khitam Abu Hamad, Al Quds University
- Dr. Ghada Al Jadba, UNRWA, Health Program
- Dr. Issa Saleh, UNRWA, Health Program
- Dr. Zoheir El khatib, UNRWA, Health Program
- Dr.Rafat A. Sabha, UNRWA , Health Program
- Mr. Jehad Okasha, Palestinian Ministry of Health
- Dr. Ariffa Al Kasseh, Islamic University of Gaza
- Dr. Ashraf Aljedi, Islamic University of Gaza

عنوان الدراسة: العلاقة بين المحددات الاجتماعية للصحة وحالة السيطرة على معدل السكر بين مرضى السكري من النوع الثاني في المراكز الصحية التابعة للأونروا في محافظات غزة

اعداد: نسرين زياد الحلبي

اشراف: د. يوسف الجيش

ملخص الدراسة

الأمراض غير المعدية هي السبب الرئيسي للوفاة والاعتلال في القرن الماضي بسبب نمط الحياة المستقرة والمتحضرة، ويعتبر داء السكري من النوع الثاني أحد أهم هذه الأمراض حيث أن نسبة انتشاره بين سكان قطاع غزة فوق عمر الأربعين12.9%وتتزايد هذه النسبة بشكل مضطرد.

تعرف المحددات الاجتماعية للصحة بانها العوامل التي نعيش فيها، ننمو، نعمل ونموت. الهدف من هذه الدراسة هو تقييم العلاقة بين المحددات الاجتماعية وحالة السيطرة على مرض السكري من النوع الثاني في مراكز الأونروا الصحية في قطاع غزة. هذه الدراسة مقطعية باستخدام استبيان تم تنفيذه عن طريق المقابلات. وقد أجريت هذه الدراسة في العيادات الصحية التابعة للأونروا في الفترة من أيار / . حيث أخذت عينة عشوائية من العيادات تشمل المحافظات 2018مايو 2017 وحتى شباط / فبراير الخمسة وكان المشاركون من المرضى الذين لديهم ملف السكري من النوع الثاني في عيادات الأونروا، وقد تم اختيارهم من العيادات. كان عدد المشاركين أربعمائة مريض، مئتان منهم لديهم نسبة السكر في الدم منتظمة بمعنى أن الهيموغلوبين السكري لديهم أقل من أو يساوي سبعة. أما المئتان الآخرتان كانت لديهم نسبة السكر في الدم غير منتظمة بمعنى أن الهيموغلوبين السكريأكثر من سبعة وذلك للسماح بالمقارنة بين المحددات الاجتماعية للصحة بين هاتين المجموعتين

تم حساب عدد العينة وفقا لعدد المرضى الذين يعانون من مرض السكري من النوع الثاني في عيادات الأونروا لتكون عينة تمثيلية. تم استخدام البرنامج الإحصائي للعلوم الاجتماعية للتحليل. وقبل ذلك تم الحصول على الموافقة الأخلاقية الشفهية من المرضى المشاركين. وقد أظهرت نتائج الدراسة أن عمر المريض له تأثير في السيطرة على نسبة السكر في الدم مع قيمة.0.001 p بمعنى ان كلما زاد العمر كلما تحسنت نسبة الهيموغلوبين السكري في الدم اما العمل فيبدو أنه ليس له تأثير كبير في السيطرة على نسبة السكر في الدم ولكن العمر عند ترك العمل له تأثير كبير مع قيمة .0.003 pاما بالنسبة للدخل فقد أثبتت الدراسة ان له تأثير في السيطرة على نسبة السكر في الدم مقارنة مع غير المنتظم بمعني أن الحصول على دخل كاف له سيطرة أفضل من الذي ليس لديه دخل كاف بقيمة .0.05 p اما بالنسبة لظروف المعيشة ومؤشر الازدحام في المنزلفقد تبين ان له تأثير في السيطرة على المرضبقيمة14 p0.0 و p.001 على التوالي. اما عند دراسة علاقة وجود مرض مشترك مثل ارتفاع ضغط الدم او مرض القلب فقد ظهر انه يمكن أن يؤثر على حالة التحكم مع قيمة0.049 p اما بالنسبة لعلاقة عدد سنوات الإصابة بمرض السكري مع نسبة الهيموغلوبين السكريفقد تبين ان هناك علاقة طردية فكلما زادت عدد سنوات الإصابة بالسكري كلما زادت نسبة الهيموغلوبين السكري.

ومن خلال هذه الدراسة قد تبين أيضا ان زيادة مستوى التوتر يمكن أن يزيد من نسبة الهيموغلوبين السكري،على الجانب الآخر، يبدو أن الرصد الذاتي لسكر الدم وساعات النوم ليس له تأثير في السيطرة على مرض السكر. وخلصت الدراسة إلى أن بعض المحددات الاجتماعية للصحة يمكن أن يكون لها تأثير على حالة السيطرة على داء السكري من النوع الثاني والتحكم في هذه المحددات سيحسن من السيطرة على مرض السكري.